

**RECORD OF DECISION  
FOR  
EARLY ACTION SOIL CLEANUP OF RESIDENTIAL  
PROPERTIES**

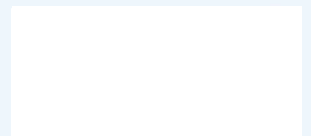
**SOUTHSIDE CHATTANOOGA LEAD SITE**

**CHATTANOOGA, HAMILTON COUNTY  
TENNESSEE**



PREPARED By:  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION 4 SUPERFUND DIVISION  
ATLANTA, GEORGIA

February 2019



**PART I  
DECLARATION  
SOUTHSIDE CHATTANOOGA LEAD SITE  
RECORD OF DECISION  
FOR EARLY ACTION SOIL CLEANUP OF RESIDENTIAL PROPERTIES**

**Site Name and Location**

The Southside Chattanooga Lead Site (Site) is located in Chattanooga, Hamilton County, Tennessee. The U.S. Environmental Protection Agency (EPA) Site identification number is TNN000410686. The Site consists of residential and child high impact properties (common areas such as playgrounds, parks, daycare centers, etc.), where lead-bearing material from past foundry operations was used as fill and top soil. The Site includes eight residential neighborhoods: Alton Park, Cowart Place, East Lake, Highland Park, Jefferson Heights, Oak Grove, Richmond, and Southside Gardens. Impacted commercial and industrial properties may be addressed by the state pursuant to its Brownfield Project Voluntary Cleanup Oversight and Assistance Program or other state authority.

**Statement of Basis and Purpose**

This decision document presents the Selected Remedy for an early action soil cleanup of residential properties at the Southside Chattanooga Lead Site, in Chattanooga, Tennessee, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record (AR) file for this Site.

The State of Tennessee as represented by the Tennessee Department of Environment and Conservation (TDEC) concurs with the Selected Remedy. A copy of TDEC's concurrence letter is included in **Appendix A**.

**Assessment of the Site**

The response action selected in this Record of Decision (ROD) is necessary to protect human health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health or welfare.

**Description of Selected Remedy**

This ROD is for an early action to address lead contaminated soil at residential properties in eight neighborhoods (Alton Park, Cowart Place, Jefferson Heights, Southside Gardens, Richmond, Highland Park, Oak Grove, and East Lake). This action is necessary to prevent children exposure to the lead contaminated soil. Remedial investigation activities to characterize the Site groundwater, surface water, and sediment are ongoing. These media, if impacted by Site-related contaminants, will be addressed in the final ROD for the Site.

The Selected Remedy calls for the excavation and off-site disposal of lead contaminated soil from residential yards to a maximum depth of 2 feet below land surface (bls). Excavated soil will be transported and disposed off-site at an EPA approved facility. Excavated soil will be sampled to determine if the soil will be disposed of as either hazardous waste or non-hazardous waste. Treatment of excavated soil, if needed, will be conducted at and by the approved disposal facility. The excavated areas will be backfilled with clean material and graded to provide positive drainage. Impacted and disturbed areas will be restored.

Although not anticipated, if lead-bearing material is present at a property at depth greater than 2 feet bls, a demarcation material/barrier will be placed at the bottom of the excavated area to mitigate direct contact with the contaminated material left in place, and EPA in collaboration with TDEC, will evaluate the type(s) of institutional controls (ICs) that may be appropriate to ensure long-term protectiveness of the remedy.

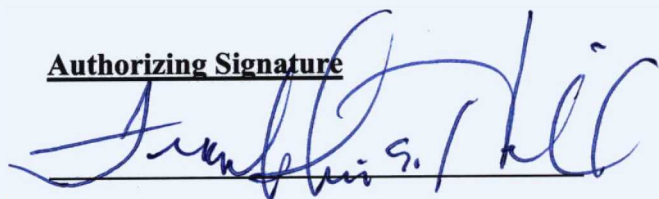
### **Statutory Determinations**

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment technologies (or resource recovery) to the maximum extent practicable. This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because of technical limitations related to treatment technologies for lead. Although not anticipated, this remedy may result in hazardous substance, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. In the event that lead-bearing material is left in place at depth greater than 2 feet, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

### **Data Certification Checklist**

1	Chemicals of concern (COCs) and their respective concentrations	Section 7.0
2	Baseline risk represented by the COCs	Section 7.0
3	Cleanup levels established for COCs and the basis for these levels	Section 8.0
4	How source materials constituting principal threats will be addressed	Sections 11.0 and 12.0
5	Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment (BRA) and the ROD	Section 6.0
6	Potential land and groundwater use that will be available at the Site as a result of the Selected Remedy	Sections 6.0 and 12.0
7	Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	Section 10.0
8	Key factors that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)	Section 10.0

**Authorizing Signature**



Franklin E. Hill, Director  
Superfund Division

2/20/2019

Date

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Table 3	Location-specific ARARs and TBC Guidance
Table 4	Selected Remedy Cost Estimate

### **APPENDICIES**

Appendix A	TDEC's Concurrence Letter
Appendix B	Responses to Comments
Appendix C	Proposed Plan Public Meeting Transcript

## **LIST OF ACRONYMS**

ARAR	Applicable or Relevant and Appropriate Requirement
bls	below land surface
BRA	Baseline Risk Assessment
CdC	Chattanooga Land Complex
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern or chemical of concern
COPC	chemicals of potential concern
CSM	Conceptual Site Model
cy	cubic yards
EPA	U.S. Environmental Protection Agency
FFS	Focused Feasibility Study
FYR	Five-year Review
HH&E	Human Health and the Environment
HHRA	Human Health Risk Assessment
IC	Institutional Control
ICAP	Institutional Control and Assurance Plan
IEUBK	Integrated Exposure Uptake Biokinetic
IRI	Interim Remedial Investigation
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operations and maintenance
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
%	percent
PP	October 2018 Proposed Plan
PRG	Preliminary Remediation Goals
RA	Remedial Action
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RSC	Regional Screening Level
SCL	Southside Chattanooga Lead
SI	Site Investigation
Site	Southside Chattanooga Lead Site
SLERA	Soil Level Ecological Risk Assessment
TCLP	Toxicity Characteristic Leachate Procedure
TDEC	Tennessee Department of Environment and Conservation
TDOH	Tennessee Department of Health
T/M/V	toxicity, mobility, or volume
Ur	Urban Land
USDA	United States Department of Agriculture

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**PART II**  
**DECISION SUMMARY**  
**SOUTHSIDE CHATTANOOGA LEAD SITE**  
**RECORD OF DECISION**  
**FOR EARLY ACTION SOIL CLEANUP OF RESIDENTIAL PROPERTIES**

**1.0 SITE NAME, LOCATION, AND DESCRIPTION**

The Southside Chattanooga Lead Site (Site) is located in Chattanooga, Hamilton County, Tennessee (**Figure 1**). The Site consists of residential and child high impact properties (common areas such as playgrounds, parks, daycare centers, etc.), where lead-bearing material from past foundry operations was used as fill and top soil. The Site includes eight residential neighborhoods: Alton Park, Cowart Place, East Lake, Highland Park, Jefferson Heights, Oak Grove, Richmond, and Southside Gardens.

The U.S. Environmental Protection Agency (EPA) is the lead agency for the Site, and the Tennessee Department of Environment and Conservation (TDEC) is the supporting agency. The EPA Site Identification Number is TNN000010686. The Site is listed on the National Priorities List (NPL). Site remediation will be conducted and funded by the EPA. The State of Tennessee is also required to provide a 10% match for EPA remedial action funds expended.

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## **2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES**

### **2.1 SITE HISTORY**

Beginning in the mid-19<sup>th</sup> century, as many as 60 foundries, both iron and brass, have historically operated within the City of Chattanooga (Figure 2). Over time, the majority of the historical foundries in the area have closed. Ferrous (iron and steel) foundries specialize in melting and casting metal into desired shapes. The casting process involves pouring molten metal into molds and sand is the most common molding material used. Foundry sand can be reused; however, sand fines are removed from the process. Used foundry sand can contain elevated concentrations of lead and other metals. Anecdotal information indicates that it was common practice in the early 1900s for foundries to give local residents excess foundry waste material to use as fill and top soil.

#### **2.1.1 Early Response Actions**

In 2011, TDEC was contacted due to a resident of Chattanooga with elevated blood lead levels. TDEC initiated soil assessment activities at the residence on Read Avenue. Initial sampling activities indicated elevated concentrations of lead in surface soil at the property. TDEC requested assistance from the EPA, Emergency Response and Removal Branch (ERRB). EPA, with assistance from TDEC, assessed residential properties along Read Avenue and an adjoining public park located on Mitchell Avenue. This assessment was conducted to determine whether the lead contamination observed at the Read Avenue property was present in adjacent properties.

In 2011, EPA and TDEC sampled several properties for lead in soil on Read Avenue, Mitchell Avenue, Underwood Street (formerly Carr Street) and intersecting streets.

In 2012, additional soil sampling was conducted in the vicinity of Read Avenue. Based on the results of these sampling activities, The EERB conducted a time-critical removal action (TCRA) and excavated approximately 8,222 tons of soil contaminated with lead from 84 properties located along Read Avenue, Mitchell Avenue, Underwood Street (formerly Carr Street) and intersecting streets. The excavated material was disposed of at an EPA-approved facility. Following the completion of these removal activities, EPA continued its evaluation, assessment, and planning activities for the Site in 2014 and 2015.

In 2016, EPA, in cooperation with TDEC and the Tennessee Department of Health (TDOH), began the site inspection (SI) for the Site to determine whether lead-contaminated foundry-related waste materials were isolated to the area of previous soil removals or whether additional areas may be impacted. After obtaining permission from property owners, EPA collected soil samples in several neighborhoods near the former foundries. The collected soil samples were analyzed for lead, arsenic and other metals. The SI determined that elevated levels of lead in soil was not limited to the Read and Mitchell Avenue area.

In 2017, based on soil sampling data, EERB conducted another TCRA and excavated lead-contaminated foundry-related waste soil from 15 residences in Jefferson Heights. The excavated material was disposed of at an EPA-approved facility.

### **2.2 ENFORCEMENT ACTIVITIES**

Activities to identify financially viable potentially responsible parties (PRP) to perform or to contribute to the cleanup of the Site are ongoing. To prevent children exposure to the lead contaminated soil, EPA

has decided to proceed with the cleanup of the Site on a fund-lead basis.

On January 18, 2018, the site was proposed for inclusion on the NPL. The NPL listing was finalized on September 13, 2018 (Federal Register Vol 83, No. 178; Docket ID No.: EPA-HQ-OLEM-2017-0605).

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### 3.0 COMMUNITY PARTICIPATION

The Community Involvement Plan (CIP) for the Site was developed in November 2017. EPA implemented the plan by involving the community in work being conducted at the Site. EPA issued fact sheets and letters, communicated through paid, published notices in the largest local daily newspaper (*Chattanooga Times Free Press*), and held public availability sessions and meetings to ensure the public was informed and allowed to participate in the process. The following summarizes the major community relations activities:

- November 2017: EPA approved the Final CIP. The CIP was placed in the public library repository. The key objectives of the CIP include coordinating with local organizations on Site information, actively engaging community stakeholders, and encouraging public participation.
- January 2018: EPA issued NPL listing Fact Sheet to inform the community of the proposed NPL listing of the Site.
- February 2018: EPA conducted a public meeting to discuss the NPL listing process.
- April 2018: EPA issued an RI/FS Fact Sheet to update the community on the progress of the RI/FS.
- May 2018: EPA conducted a public meeting to update the community on the progress of the RI/FS and address community concerns.
- November 2018: EPA issued the Proposed Plan. The notice of availability of the documents was published in *Chattanooga Times Free Press* on November 8, 2018. A public meeting was held on November 15, 2018, to present the Proposed Plan to the local community. During the meeting, EPA and TDEC's representatives answered questions about the Site and the preferred remedial alternatives. TDOH's representatives also attended the meeting and presented information about lead exposure prevention. A Public Comment Period was held from November 1, 2018 to November 30, 2018. EPA's responses to the comments received during this Public Comment Period are included in **Appendix B** of this ROD.

The documents and data that are part of the Site AR are available to the public at the Site Information Repository located at the EPA Region 4 Records Center and the Chattanooga Public Library, South Chattanooga Branch, 925 39<sup>th</sup> Street, Chattanooga, Tennessee.

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#### **4.0 SCOPE AND ROLE OF RESPONSE ACTION**

The EPA is addressing the cleanup of the Site in several phases. This ROD is for an early action to address contaminated soil that may present unacceptable risks to human health at residential properties in eight impacted neighborhoods. This action is necessary to minimize children exposure to the lead contaminated soil. Future response actions will address the Site groundwater, surface water, and sediment.

Activities to fully characterize the Site are ongoing. Based on Hamilton County Census data, it is estimated that approximately 3,600 properties within the eight known impacted neighborhoods will require sampling. As of May 18, 2018, approximately 300 properties have been sampled. EPA evaluated the data collected to date and estimated that approximately 30 percent (%) of the total (3,600) properties contain lead-bearing material with concentrations above the site-specific preliminary remediation goal (for residential use and protection of children) of 360 milligrams per kilogram (mg/kg). This results in an estimated 1,100 properties that will require remediation.

The number of impacted properties referenced in this ROD with elevated lead concentrations in surface soil are an estimate used to calculate the approximate costs of the cleanup alternatives. EPA believes that the estimate is not likely to change significantly. The precise number of residential properties to be remediated will be determined upon completion of additional soil sampling during the remedial design and possibly refined during implementation of the remedial action. The ROD will be implemented pursuant to the remedial authorities of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and will not be the final response for this site.

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## **5.0 SITE CHARACTERISTICS**

### **5.1 SITE PHYSICAL CHARACTERISTICS**

The Site is situated within the Ridge and Valley physiographic province of southeastern Tennessee. The Ridge and Valley province is characterized by long north-northeasterly trending ridges separated by fertile valleys and extends continuously from New York to the edge of the Coastal Plain (fall line) in Alabama. The province's topography is due to the erosion of alternating layers of hard and soft sedimentary rock that were folded and faulted during the building of the Appalachians. The ridges are developed on resistant layers of sandstone or chert, while the valleys are underlain by shale or limestone. Thin acidic soils are formed from the sandstone and chert, which support wooded areas on the ridges' steep slopes. In the valleys, shale and especially limestone provide thicker, more fertile lowland soils.

Elevations in the Chattanooga area range from 675 feet above sea level near the Tennessee river to 2,391 feet above sea level on Lookout Mountain. The topography across the Site is generally flat.

The United States Department of Agriculture (USDA) soil survey of Hamilton County, Tennessee indicates that the predominant soil types in the SCL study area are Urban Land (Ur) and Colbert-Urban Land Complex (CdC). The USDA notes that the Ur soils are found in the inner city of Chattanooga where at least 85% of the land is covered by buildings, streets, sidewalks, and other structures. No identifiable soils are found in the Ur unit. The CdC is comprised of well drained, gently sloping and sloping brown silt loam, and Ur soils. The CdC soils grade to a yellowish-brown clay below the first 4-inches. Limestone can be encountered at depths as shallow as 55-inches bls.

During the SI sampling activities, field personnel observed that the soil to a depth of 18 inches was dark brown, with the remaining soils varying from reddish brown and light brown. These soils were predominantly composed of silts, with minor sand and clay present. At locations where fill contained a large amount of foundry waste material, the fill was a coarse material which was dark brown, dark gray or black.

Hydrology at the Site primarily consists of storm water runoff from parking lots, roads, ground surface, drainage ditches, and surface water in small creeks in the neighborhoods. Surface water runoff from Highland park, Oak Grove, Cowart Place, and Jefferson Heights drain into the combined sanitary sewer system of the City of Chattanooga Public Water Works combined sanitary sewer system. East Lake, Alton Park and Southside Gardens are in the Chattanooga Creek watershed. The Tennessee River is located approximately 1 mile to the west of the Site and flows to the south. Chattanooga Creek is located to the west of East Lake and east of Alton Park neighborhoods and flows to the north. Downstream of the confluence with Dobbs Branch, Chattanooga Creek flows to the west/southwest to the Tennessee River.

Groundwater beneath the Site is classified by the state as a potential source of drinking water. A groundwater investigation will be conducted in the future as part of the RI for the Site. Based on environmental investigation data from other sites in the area, groundwater is approximately 10 to 20 feet bls. Groundwater is suspected to generally flow to the west and/or south toward the Tennessee River or Chattanooga Creek. Future investigations at the Site will provide better understanding of the Site-specific hydrogeology.

## **5.2 NATURE AND EXTENT OF CONTAMINATION**

Between May 2011 and May 2018, soil samples were collected from approximately 300 properties at the Site. The collected soil samples were analyzed for metals. Some samples were also analyzed for polycyclic aromatic hydrocarbons (PAHs). Lead, the primary contaminant of concern (COC) for the Site was detected in the soil at concentrations above the site-specific preliminary cleanup goal of 360 mg/kg. The highest lead concentrations of 2,610 mg/kg were observed from soil samples collected at a property in Jefferson Heights. The analytical results of the collected soil samples are presented in the interim Remedial Investigation Report (B&V, October 2018). The sections below present a summary of the data included in the interim RI report.

Activities to fully characterize the Site are ongoing. Based on Hamilton County Census data, it is estimated that approximately 3,600 properties within the eight known impacted neighborhoods will be sampled. As of May 18, 2018, approximately 300 properties have been sampled. EPA evaluated the data collected to date and estimated that approximately 30% of the total (3,600) properties contain lead-bearing material with concentrations above the site-specific preliminary remediation goal of 360 mg/kg. This results in an estimated 1,100 properties that will require remediation.

Based on information collected during the removal actions conducted in 2012 and 2017, it was determined that the average lot size is approximately a quarter of an acre [10,000 square feet (sf)]. The typical lot has a house that occupies approximately one half of the surface area. A quarter of the typical lot is also covered with impervious material such as asphalt and concrete. Therefore, EPA estimated that approximately a quarter (25%) of the surface area of each impacted property will be remediated to a maximum depth of 2 feet bls. The total volume of lead-contaminated soil requiring remediation is estimated to be 203,703 cubic yards (cy). Additional details regarding the extent of the contamination are included in the focused feasibility study (FS) report (B&V, October 2018).

Because the foundry waste material was not distributed uniformly across the Site or neighborhoods, there is no centralized source area of lead contamination. The sections below present a brief summary of the extent of the contamination in each neighborhood.

### **5.4.1 Alton Park**

Alton Park is located in the southwest portion of the Site (**Figure 1**). There are approximately 566 residential properties in this neighborhood. During the SI and 2018 sampling activities, a total of 116 properties within the Alton Park neighborhood were sampled (**Figure 3**). Of these 116 properties, 89 had concentrations of lead below the site-specific preliminary remediation goal. Twenty-seven of the properties sampled had lead concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Alton Park were non-detect, 266 mg/kg, and 900 mg/kg, respectively.

### **5.4.2 Cowart Place**

Cowart Place is located in the northwest portion of the Site (**Figure 1**) and includes approximately 232 residential properties. During the SI and 2018 sampling efforts, a total of 14 properties within the Cowart Place neighborhood were sampled (**Figure 4**). Nine sampled properties had concentrations of lead below the site-specific preliminary remediation goal. Five of the sampled properties had lead

concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Cowart Place were non-detect, 378 mg/kg, and 580 mg/kg, respectively.

#### **5.4.3 Jefferson Heights**

The Jefferson Heights neighborhood is located in the north central portion of the Site (**Figure 1**). There are an estimated 170 residential properties in this neighborhood. A total of 73 properties were sampled in Jefferson Heights during the SI and the 2018 sampling effort (**Figure 5**). Fifty-three of the sampled properties had concentrations of lead below the site-specific preliminary remediation goal. Twenty of the 73 properties had lead concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Jefferson Heights were non-detect, 489 mg/kg, and 2,610 mg/kg, respectively.

#### **5.4.4 Richmond**

The Richmond neighborhood is located in the southwest portion of the Site just north of the Alton Park neighborhood (**Figure 1**) and includes approximately 55 residential properties. During the SI, a total of 16 properties within the Richmond neighborhood were sampled (**Figure 6**). Of these, 11 had concentrations of lead below the site-specific preliminary remediation goal. Five of the properties sampled had lead concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Richmond were non-detect, 242 mg/kg, and 460 mg/kg, respectively.

#### **5.4.5 Southside Gardens**

The Southside Gardens neighborhood is located in the north central portion of the Site, southwest of the Cowart Place neighborhood (**Figure 1**). An estimated 145 residential properties are included in this neighborhood. Thirty-three properties within the Southside Gardens neighborhood were sampled as part of the SI and the 2018 sampling activities (**Figure 7**). Eighteen of the sampled properties had concentrations of lead below the site-specific preliminary remediation goal. Fifteen properties had lead concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Southside Gardens were non-detect, 467 mg/kg, and 1,873 mg/kg, respectively.

#### **5.4.6 Highland Park**

Highland Park is located in the northeast portion of the Site (**Figure 1**). Approximately 850 residential properties are included in this neighborhood. During the 2017 sampling effort, a total of 16 properties within the Highland Park neighborhood were sampled (**Figure 8**). Twelve sampled properties had concentrations of lead below the site-specific preliminary remediation goal. Four of the properties had lead concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Highland Park were non-detect, 414 mg/kg, and 1,293 mg/kg, respectively.

#### **5.4.7 East Lake**

The neighborhood of East Lake is in the southeast portion of the Site (**Figure 1**). An estimated 1,267 residential properties in this neighborhood will need to be investigated. During the 2017 sampling effort,



a total of eight properties within the East Lake neighborhood were sampled (**Figure 9**). Seven sampled properties had concentrations of lead below the site-specific preliminary remediation goal. One property had lead concentrations of 396 mg/kg, which are above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in East Lake were non-detect, 253 mg/kg, and 396 mg/kg, respectively.

#### **5.4.8 Oak Grove**

The Oak Grove neighborhood is in the east-central portion of the Site between Highland Park and Southside Gardens (**Figure 1**) and includes approximately 327 residential properties. During the 2017 sampling effort, a total of ten properties within the East Lake neighborhood were sampled (**Figure 10**). Five of the properties that were sampled had concentrations above the site-specific preliminary remediation goal. The minimum, average, and maximum concentrations of lead observed in Oak Grove were non-detect, 351 mg/kg, and 832 mg/kg, respectively.

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## **6.0 CURRENT AND POTENTIAL FUTURE LAND AND WATER USES**

Properties in downtown Chattanooga are primarily zoned for residential, commercial and industrial use. The Site consists of residential properties and child high impact properties (common areas such as playgrounds, parks, daycare centers, etc.). It is anticipated the estimated 1,100 lead-contaminated residential properties with the eight impacted neighborhoods will remain in residential use for the foreseeable future. Also located within the impacted neighborhoods are non-residential (commercial/industrial) properties. Impacted commercial/industrial properties may be addressed by the state pursuant to its Brownfield Project Voluntary Cleanup Oversight and Assistance Program. There are current local interests to convert some current non-residential properties to residential (multi-unit) use.

Groundwater beneath the Site is classified as a potential source of drinking water. Currently, the groundwater is not used as a drinking water supply. Drinking water for the surrounding area is provided Tennessee American Water and is drawn from the Tennessee River. The closest drinking water intake is located approximately 8 miles upstream of the Site.

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## **7.0 SUMMARY OF SITE RISKS**

The scope of the interim RI data collection to date has focused on soil in residential areas. Details of the streamlined risk assessment are presented in the streamlined Human Health Risk Assessment included in the interim RI report (B&V, October 2018). Ecological risk assessment will be conducted and included in the final RI report for the Site.

During the SI, approximately 300 surface soil samples were collected and analyzed for metals and PAHs. The laboratory results of the collected soil samples were compared with the urban background concentrations and the residential soil values in the May 2018 Regional Screening Level (RSL) table to identify the Contaminants of Potential Concern (COPCs). The COPCs were then used to estimate potential human health risks based on a residential exposure.

For this evaluation, risks were calculated for a hypothetical yard containing the maximum concentration detected for each COPC, excluding lead. This conservative evaluation showed that contaminant-specific risks were within EPA's acceptable risk range ( $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ ), except for PAHs which resulted in risk levels of  $2.4 \times 10^{-4}$ . Further analyses of the data concluded that benzo(a)pyrene was the primary risk driver. There was only one residential property with benzo(a)pyrene at the upper end of the risk range and that property also had elevated lead, therefore would require a cleanup based on the elevated lead concentrations. The properties surrounding the yard with the detection of benzo(a)pyrene at the upper end of the risk range were within EPA's acceptable risk range, but elevated concentrations of lead were present. Therefore, it was concluded that PAHs are not site-related contaminants.

Lead is the primary COC for the Site. In accordance with EPA's recommended risk assessment approach for lead, potential health risks to children were evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) model. The model calculated the expected distribution of blood lead levels and estimated the probability that child exposure to the Site soil may result in blood lead levels greater than the target concentrations of 5 micrograms per deciliters ( $\mu\text{g/dL}$ ) and 8  $\mu\text{g/dL}$ .

Using the maximum lead concentrations observed at the Site to represent lead concentrations in a hypothetical Site yard, it was determined that there is a probability of more than 90% that a child exposed to the Site soil would have blood lead level greater than 8  $\mu\text{g/dL}$ . However, when the mean concentrations observed at the Site were used to represent concentrations in a hypothetical yard, it was determined that there is less than a 5 percent probability that the residential child would have blood lead level greater than 8  $\mu\text{g/dL}$ .

### **7.1 BASIS FOR ACTION**

It is the EPA's judgment that the Selected Remedy presented in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.



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## **8.0 REMEDIAL ACTION OBJECTIVES**

Before developing cleanup alternatives for a Superfund site, EPA establishes remedial action objectives (RAOs) to protect human health and the environment. RAOs are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific, risk-based levels.

Soil contamination on residential properties is present in surface soil. The following RAOs for contaminated soil to attain a degree of cleanup that ensures the protection of human health and the environment:

- Prevent potential current and future unacceptable risks to human receptors resulting from direct contact with soil containing lead at concentrations above the cleanup level.
- Prevent migration of lead from the impacted properties to other areas via overland flow and air dispersion.

### **8.1 CLEANUP LEVELS**

Cleanup levels are concentrations of contaminants in environmental media that, when attained, are protective and achieve the RAOs. In general, cleanup levels are established with consideration of the following:

- Protection of human receptors from adverse health effects.
- Protection of the environment from detrimental impacts from Site-related contamination.
- Compliance with federal and more stringent state, chemical-specific ARARs.

EPA has adopted the preliminary remediation goals identified in the Proposed Plan as the cleanup level for the lead-impacted residential properties. The IEUBK model was used to estimate the probability that child exposure to the Site soil would result in blood lead levels greater than the target concentrations of 8 µg/dL. The cleanup level for lead in residential properties is 360 mg/kg.

Groundwater, and impact to groundwater, will be evaluated as part of final action for the Site.

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## 9.0 DESCRIPTION OF ALTERNATIVES

CERCLA, Section 121(b)(1), 42 U.S.C. Section 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. Section 9621(d) further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. Section 9621(d)(4).

The focused FS evaluated remedial technologies capable of addressing the contaminated soil. The remedial alternatives were screened and evaluated in accordance with the nine criteria specified in the NCP, 40 CFR Section 300.430(e)(9)(iii). The following sections summarize the alternatives that were evaluated for remediating the contaminated soil (see focused FS report for additional details) (B&V, October 2018).

### **Alternative 1: No Action**

***Estimated Capital Cost: \$0***

***Estimated Operation and Maintenance (O&M) Cost: \$88,300***

***Estimated Total Present Worth Cost: \$0***

***Estimated Timeframe to Achieve RAOs: >100 Years***

The NCP requires that a “No Action” alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated soil at residential properties. Therefore, this alternative would achieve none of the RAOs developed for the Site. Because this alternative would result in hazardous substances, pollutants, or contaminants remaining at the properties above levels that would allow for unlimited use and unrestricted exposure, EPA would review conditions at residential properties every five years.

### **Alternative 2: Excavation and Off-Site Disposal**

***Estimated Capital Cost: \$25,870,600***

***Estimated Operation and Maintenance (O&M) Cost: \$0***

***Estimated Total Present Worth Cost: \$25,870,600***

***Estimated Timeframe to Achieve RAOs: 5 Years***

Under this alternative, contaminated soil exceeding the cleanup level would be excavated to a maximum depth of 2 feet bls. Excavated soil would be transported and disposed off-site at an EPA approved facility. Excavated soil would be sampled to determine if the soil would be disposed of as either hazardous waste or non-hazardous waste. Treatment of soil, if needed, would be conducted at and by the approved disposal facility. The excavated areas would be backfilled with clean material and graded to provide positive drainage. Impacted and disturbed areas would be restored.

Although not anticipated, if lead-bearing material is present at a property at depth greater than 2 feet bls,

a demarcation material/barrier would be placed at the bottom of the excavated area, and EPA in collaboration with TDEC, will evaluate the type(s) of institutional controls (ICs) that may be appropriate to ensure long-term protectiveness of the remedy. In addition, Five-Year reviews would be conducted accordingly.

As discussed in Section 5, activities to fully characterize the Site are ongoing. However, based on the data collected as of May 2018, it is estimated that approximately 1,100 properties that will require remediation.

Based on information collected during the removal actions, it was determined that the average lot size is approximately a quarter of an acre [10,000 square feet (sf)]. The typical lot has a house that occupies approximately one half of the surface area. A quarter of the typical lot is also covered with impervious material such as asphalt and concrete. Therefore, EPA estimated that approximately a quarter (25%) of the surface area of each impacted property will be remediated to a maximum depth of 2 feet bls. The total volume of lead-contaminated soil requiring remediation is estimated to be 203,703 cy.

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## 10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial alternatives described in Section 9 of this ROD were evaluated in accordance with the NCP, CFR (40 CFR Part 300.430[e] [9] iii), CERCLA, and factors described in the *Guidance for Conducting RI/FS under CERCLA* (EPA, 1988). This section summarizes the detailed evaluation of these alternatives in accordance with the nine criteria specified in the NCP, 40 CFR Section 300.430(e)(9)(iii). This evaluation was completed in accordance with the nine criteria summarized below.

The nine evaluation criteria include the following:

### Threshold Criteria

- Overall protection of human health and the environment
- Compliance with ARARs

### Balancing Criteria

- Short-term effectiveness
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Implementability
- Cost

### Modifying Criteria

- State acceptance
- Community acceptance

A comparative analysis of the alternatives based on the nine criteria is presented in the following sections. The objective of this analysis is to compare and contrast the alternatives and to support the selection of a remedy to address the Site contamination. **Table 1** presents a summary of the comparative analysis. Additional details regarding the comparative analysis of the remedial alternatives are provided in Section 5 of the focused FS report.

## 10.1 THRESHOLD CRITERIA

### 10.1.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether the alternative provides adequate protection of human health and the environment, and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls.

Alternative 2 which consists of excavation and offsite disposal of the contaminated soil would be protective of human health and the environment. Under Alternative 1, the contaminated soil would be left in place. Therefore, Alternative 1 would not be protective of human health and the environment.

### **10.1.2 Compliance with Applicable or Relevant and Appropriate Requirements**

Section 121(d) of CERCLA and the NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations, which are collectively referred to as “ARARs,” unless such ARARs are waived under CERCLA § 121 (d)(4). Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site.

Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of general applicability and are legally enforceable. State standards are considered more stringent where there is no corresponding federal standard, the state standard provides a more stringent concentration of a contaminant, or the state standard is broader in scope than a federal requirement.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The “to-be-considered” (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. See 40 CFR § 300.400(g)(3). TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site, but are evaluated along with ARARs as part of the risk assessment to set protective cleanup levels. TBCs can be used in the absence of ARARs when ARARs are insufficient to develop cleanup levels, or when multiple contaminants may be posing a cumulative risk. See EPA, Office of Solid Waste and Emergency Response (OSWER) Directive No. 9234.0-05, Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements (July 9, 1987).

There are three different categories of ARARs:

Chemical-specific requirements include those laws and regulations governing the release of materials possessing certain chemical or physical characteristics, or containing specified chemical compounds. Chemical-specific requirements set health- or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, contaminants, and pollutants.

Action-specific requirements are technology-based or establish performance, design, or other similar action-specific controls or regulations for the activities related to the management of hazardous substances or pollutants. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed, emitted, discharged, or otherwise managed.

Location-specific requirements are design requirements or activity restrictions based on the geographic



or physical position of the site and its surrounding area. Location-specific requirements set restrictions on the types of remedial activities that can be performed based on site-specific characteristics or location.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or provides a basis for invoking a waiver.

ARARs identified for the Site are presented in **Tables 2 and 3**.

Alternative 2 complies with the ARARs identified for the Site and a waiver under CERCLA 121(d)(4) is not necessary.

## **10.2 BALANCING CRITERIA**

### **10.2.1 Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time until the cleanup levels are met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 2 would provide long-term effectiveness and permanence by removing contaminants from residential properties and providing secure disposal of excavated soil at appropriate permitted facilities.

Under Alternative 2, long-term monitoring and maintenance of the residential properties and CERCLA Five-Year reviews would not be required unless foundry material with lead concentrations above the cleanup level remains below the demarcation barrier. It is anticipated that the properties will be remediated to unrestricted use. Therefore, Five-Year reviews are not anticipated. Alternative 1 would not be effective since the impacted material would be kept in place.

### **10.2.2 Reduction Toxicity, Mobility or Volume through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Neither Alternative would achieve reduction of toxicity, mobility or volume through treatment.

### **10.2.3 Short-Term Effectiveness**

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Under Alternative 2, appropriate safeguards and health and safety protocols would be implemented to protect Site workers and residents. Engineering controls would be used to manage truck traffic, minimize dust, and manage stormwater. Alternative 1 would be more effective in the short-term since no activities would be conducted.

#### 10.2.4 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other government entities are also considered.

Alternative 2 (excavation and off-site disposal) is a well-established technology and has been implemented at many sites with readily available equipment, technical specialists, contractors and materials. Both Alternatives 1 and 2 are implementable.

#### 10.2.5 Cost

Cost estimates for all remedial alternatives (using an effective discount rate of 7 percent) were developed during the focused FS and are summarized in the Table below.

Alternative	Description	Capital Cost	O&M Cost	Total Cost
Alternative 1	No Action	\$0	\$88,300	\$88,300
Alternative 2	Soil Excavation and Off-Site Disposal	\$25,870,000	\$0	\$25,870,000

### 10.3 MODIFYING CRITERIA

#### 10.3.1 State Acceptance

The State of Tennessee, as represented by TDEC, has been actively involved in the development and review of the SI, RS, FS, risk assessment and other studies and cleanup plan for the Site. TDEC has expressed its support for the Selected Remedy. A copy of TDEC's concurrence letter is included in **Appendix A**.

#### 10.3.2 Community Acceptance

EPA conducted a public meeting on November 15, 2018 to present the Proposed Plan to the public. Alternative 2, the preferred remedy in the Proposed Plan, was presented at the public meeting. The community indicated support for the preferred alternative during the meeting. Written comments were received during the public comment period. These comments were considered during the preparation of this ROD. A copy of the comments and written responses is included as **Appendix B** of this ROD.

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## **11.0 PRINCIPAL THREAT WASTE**

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 CFR §300.430(a)(1)(iii)(A)). The “principal threat” concept is applied to the characterization of “source material” at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to the groundwater, surface water, or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater may be viewed as source material. Principal threat wastes (PTW) are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. Remedies which involve treatment of PTW likely will satisfy the statutory preference for treatment as a principal element, although this will not necessarily be true in all cases.

Although lead in soil at the residential properties may act as sources to surface water, sediment, and groundwater contamination, these sources are not highly mobile and are not considered PTW for this early action of the Site.

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## **12.0 SELECTED REMEDY**

Based on the analysis presented in Section 10 of this ROD, Alternative 2, is the EPA's Selected Remedy for achieving RAOs for the residential properties with lead contaminated soil.

The Selected Remedy calls for the excavation and off-site disposal of lead contaminated soil from residential yards to a maximum depth of 2 feet bls. The excavated soil may be staged or stored temporarily prior to transport to an EPA-approved facility for disposal. The excavated soil will be sampled to determine if the soil will be disposed of as either hazardous waste or non-hazardous waste. Treatment of excavated soil, if needed, will be conducted at and by the approved disposal facility. The excavated areas will be backfilled with clean material and graded to provide positive drainage. Impacted and disturbed areas will be restored.

Although not anticipated, if lead-bearing material is present at a property at depth greater than 2 feet bls, a demarcation material/barrier will be placed at the bottom of the excavated area, and EPA in collaboration with TDEC, will evaluate the type(s) of ICs that may be appropriate to ensure long-term protectiveness of the remedy.

### **12.1 RATIONALE FOR THE SELECTED REMEDY**

The Selected Remedy was chosen over the No Action Alternative because of its overall potential effectiveness and efficiency in addressing the contaminated soil by permanently removing the contaminated soil that may present unacceptable risks to human health. The State and the community have expressed support for the Selected Remedy.

### **12.2 SELECTED REMEDY COST**

The estimated total present worth cost for the Selected Remedy is approximately \$26 million, and a summary of the cost estimate is provided in Table 4. The cost estimate is based on the best available information regarding the anticipated scope of the remedial action and includes a discount rate of 7 percent. Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design.

Major cost changes may be documented in the form of a memorandum to the AR, an Explanation of Significant Differences (ESD) or a ROD amendment (AROD). The projected cost is based on an order-of-magnitude engineering cost estimate that is expected to be within +50 or -30 percent of the actual project cost.

### **12.3 EXPECTED OUTCOMES OF SELECTED REMEDY**

The Selected Remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risks at the Site through removal of the contaminated soil. The Selected Remedy does not meet the statutory preference for treatment because of technical limitations related to treatment technologies for lead. Depending on the characteristics of the excavated material, treatment may be conducted at the disposal facility prior to final disposition of the excavated material.

Since it is anticipated that the lead-contaminated impacted soil will be removed from all Site-impacted properties, the remediated properties will be suitable for unrestricted use and unlimited exposure.

Implementation of the Selected Remedy and achievement of the cleanup levels will accomplish the RAOs for the Site. Immediately upon completion of construction, potential exposure to Site contamination will be eliminated, thus ensuring protection of human health and the environment.

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### **13.0 STATUTORY DETERMINATIONS**

EPA believes the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs over the No Action alternative with respect to the balancing and modifying criteria. EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify a waiver); (3) be cost-effective; and (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. However, the preference for treatment as a principal element to the extent practical criterion will not be satisfied because of technical limitations related to treatment technologies for lead. The following sections discuss how the Selected Remedy meets these statutory requirements.

#### **13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT**

The Selected Remedy satisfies the statutory requirement for protection of human health and the environment by eliminating exposure pathways associated with soil containing lead with concentrations above the cleanup level. This is accomplished by implementing all the components of the Selected Remedy as presented in Section 12 of this ROD.

#### **13.2 COMPLIANCE WITH ARARS**

Section 121(d) of CERCLA and the NCP §300.430 (e)(9)(iii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as “ARARs,” unless such ARARs are waived under CERCLA § 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or State environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site.

Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable or relevant and appropriate.

In accordance with 40 CFR 300.400(g), TDEC and EPA have identified specific ARARs for the Selected Remedy. In addition, per 40 CFR 300.405(g)(3), other advisories, criteria, or guidance may be considered in determining remedies (known as TBC).

The Selected Remedy is expected to comply with all ARARs. The ARARs identified for the Site are presented in **Tables 2 and 3**.

### **13.3 COST EFFECTIVENESS**

In EPA's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: A remedy shall be cost-effective if its "costs are proportional to its overall effectiveness" (40 CFR §300.430(0(1)(ii)(D)). The EPA evaluated the overall effectiveness of those alternatives that satisfied the threshold criteria by assessing three of the five balancing criteria in combination. Those three criteria are: (1) long-term effectiveness and permanence, (2) reduction in toxicity, mobility, and volume through treatment, and (3) short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial remedy was determined to be proportional to its costs; therefore, this remedy represents a reasonable value for the money to be spent. The estimated present worth total cost of the Selected Remedy is \$26 million (see **Table 4**).

### **13.4 PERMANENT AND ALTERNATIVE TREATMENT SOLUTIONS**

The EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. The EPA has also determined that the Selected Remedy will be protective of human health and the environment and complies with ARARs. The Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, and considering State and community acceptance.

The Selected Remedy satisfies the criteria for long-term effectiveness by removing the lead contaminated soil from the Site and disposing of it off-site.

### **13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT**

As mentioned in Section 13.0 above, the Selected Remedy will not satisfy the preference for treatment as a principal element criterion because of technical limitations related to treatment technologies for lead. However, treatment of the excavated soil, if necessary, will be conducted by and at the disposal facility prior to final disposition.

### **13.6 FIVE-YEAR REVIEW REQUIREMENTS**

Section 121(c) of CERCLA and the NCP §300.430(f)(5)(iii)(C) provide the statutory and legal bases for conducting Five-Year reviews. Five-Year reviews are not anticipated under this action. The contaminated soil will be excavated and transported off-site for disposal. Therefore, the remediated properties will be available for unlimited use and unrestricted exposure.

As discussed in Section 12.0, although not anticipated, if lead-bearing material is present at a property at depth greater than 2 feet bls, a demarcation material/barrier will be placed at the bottom of the excavated area, and EPA in collaboration with TDEC, will evaluate the type(s) of institutional controls (ICs) that may be appropriate to ensure long-term protectiveness of the remedy. In the event this scenario were to be encountered, Five-Year reviews will be conducted accordingly.

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## **14.0 DOCUMENTATION OF SIGNIFICANT CHANGES**

To fulfill the CERCLA §117(b) and the NCP §300.430(f)(5)(iii)(B) and §300.430(f)(3)(ii)(A), the ROD must document and discuss the reasons for any significant changes made to the Selected Remedy from the time the Proposed Plan was released for public comment to the final selection of the remedy. The Selected Remedy for the Site outlined in this ROD is the same as the preferred remedy released in the Proposed Plan for public comment. Following review of all the comments received during the comment period from November 1 to November 30, 2018, no substantial changes were made.

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**PART III  
RESPONSIVENESS SUMMARY  
SOUTHSIDE CHATTANOOGA LEAD SITE  
RECORD OF DECISION  
FOR EARLY ACTION SOIL CLEANUP OF RESIDENTIAL PROPERTIES**

**15.0 RESPONSIVENESS SUMMARY**

The Responsiveness Summary for the Site has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP), 40 CFR §300.430(f). The Responsiveness Summary documents, for the public record, EPA's response to comments received on the Proposed Plan during the public comment period.

The Proposed Plan for the Site was issued on November 1, 2018. A public meeting was held on November 15, 2018 at the South Chattanooga Recreation Center located at 935 39<sup>th</sup> Street, Chattanooga, Tennessee. A written transcript from the meeting is included **Appendix C** of this ROD and in the AR file. The 30-day public comment period started on November 1, 2018 and ended on November 30, 2018. EPA's responses to comments are included in **Appendix B**. Several questions were asked during the public meeting by the attendees after the presentation. EPA's responses to these questions are documented in the meeting transcript, which is included in **Appendix C**.

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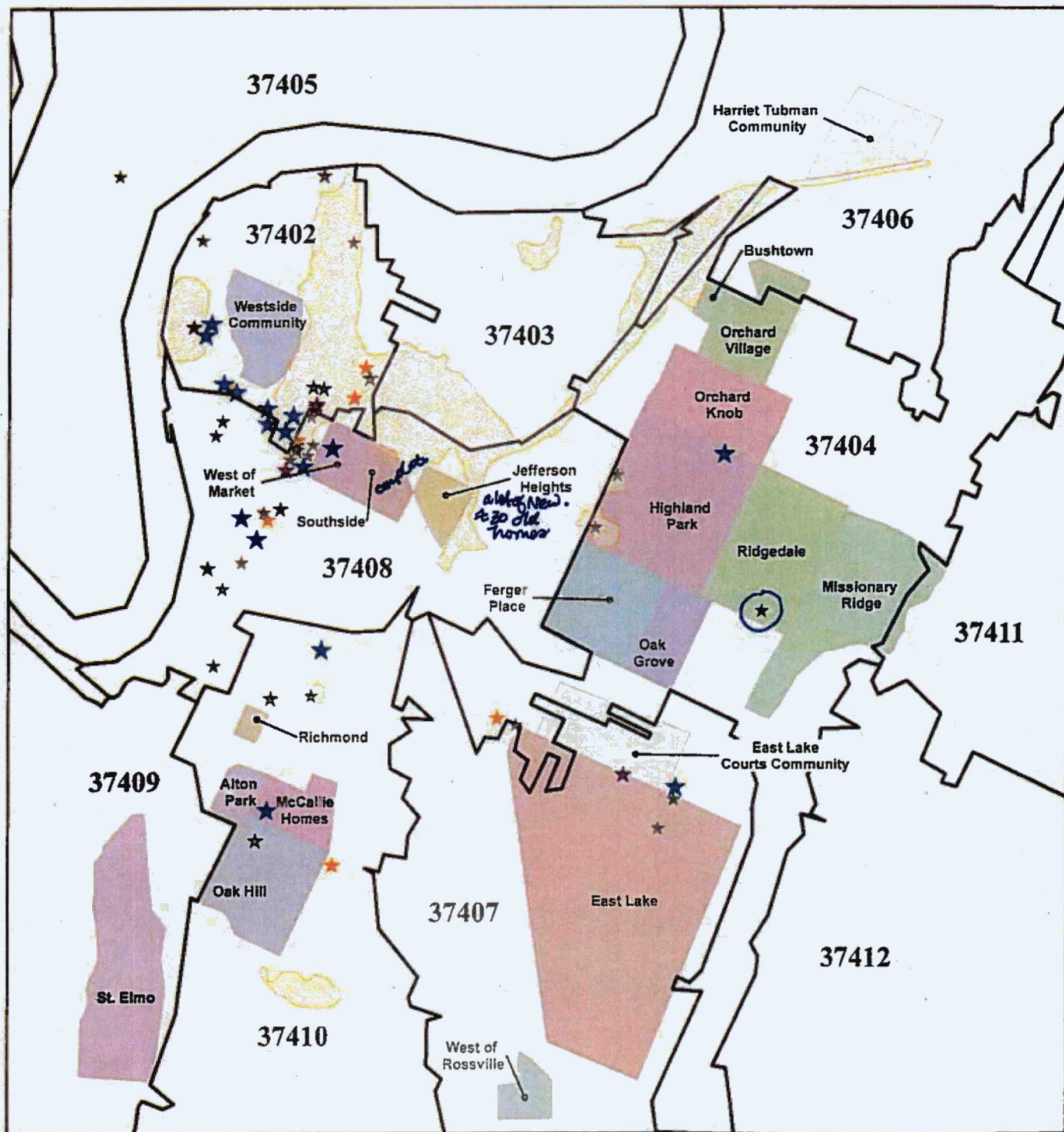


## Figures









### Legend

Md "Made" Soil

★ Foundries: Brass, Iron, Other (16)

★ Foundries: Brass Only (3)

★ Foundries: Brass, Other, No Iron (8)

★ Foundries: Unknown (12)

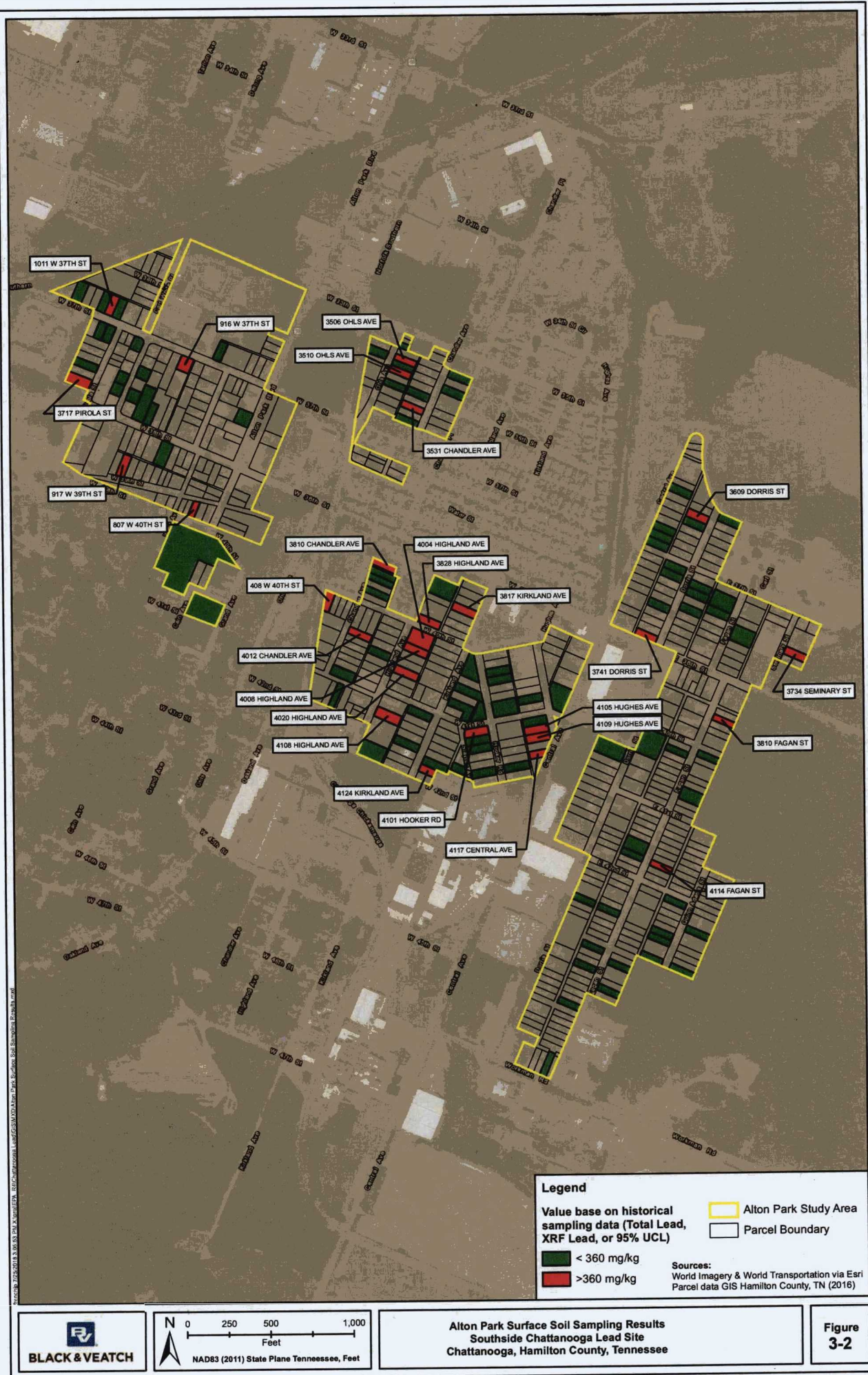
★ Other Foundries (20)



**Foundry Locations & Areas of "Made" Soil Near Chattanooga Southside & Surrounding Neighborhoods**

TDEC

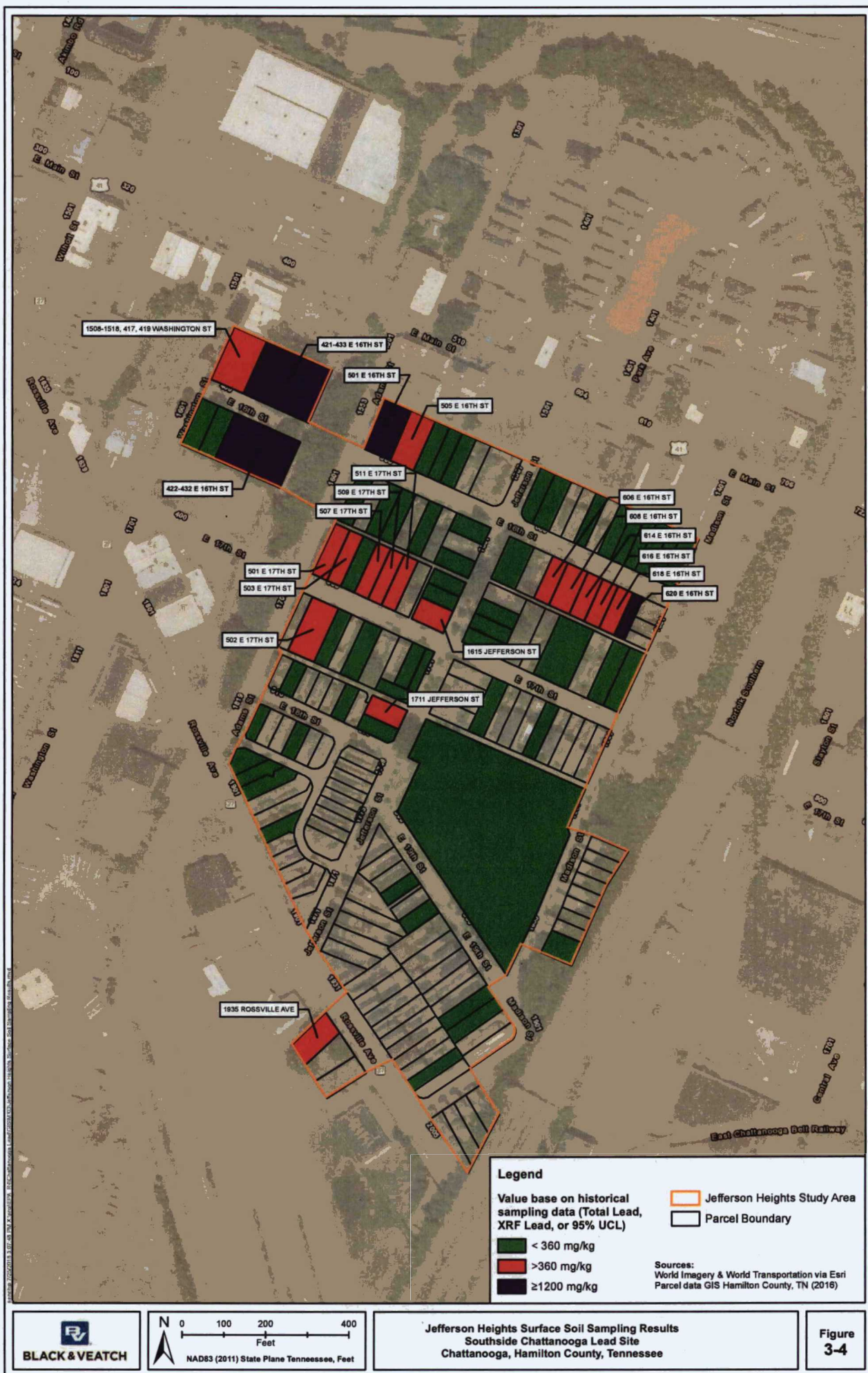






























## Tables

**Table 1**  
**Comparative Analysis of Remedial Alternatives**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Evaluation Criteria	Remedial Alternative and Comparison	
	Alternative 1	Alternative 2
	No Action	Excavation and Off-Site Disposal
<b>Threshold Criteria</b>		
Overall Protection of Human Health and Environment	Not Protective	Would be protective of human health and the environment. Contaminated soil would be excavated and transported off-site for disposal.
Compliance with ARARs	Would not comply	Would comply with ARARs
<b>Balancing Criteria</b>		
Long-Term Effectiveness and Permanence	Not effective or permanent	Would comply with NCP; contaminated soil would be excavated and transported off-site for disposal.
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	No reduction in toxicity, mobility, or volume of contaminants	No reduction in toxicity, mobility, or volume of contaminants
Short-Term Effectiveness	No short-term effects but would not be protective	Moderate short-term effects; But could be effectively managed.
Implementability	Implementable	Implementable at the site; uses proven technologies.
Cost		
Capital	\$0.00	\$25,870,600.00
30-Year NPW of O&M	\$88,300.00	\$0.00
30-Year NPW	\$88,300.00	\$25,870,600.00
<b>Modifying Criteria</b>		
State Acceptance	Would not support	Would support
Community Acceptance	Would not support	Would support

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
<b><i>General Construction Standards – All Land-disturbing Activities (i.e., excavation, grading, etc.)</i></b>			
Activities causing fugitive dust emissions	Shall take reasonable precautions to prevent particulate matter from becoming airborne; reasonable precautions shall include, but are not limited to, the following: <ul style="list-style-type: none"> <li>• use, where possible, of water or chemicals for control of dust, and</li> <li>• application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stock piles, and other surfaces which can create airborne dusts;</li> </ul>	Fugitive emissions from demolition, construction operations, grading, or the clearing of land — <b>applicable</b>	TDEC 1200-3-8-.01(1)(a)-(b)
	Shall not cause or allow fugitive dust to be emitted in such a manner as to exceed 5 minutes per hour or 20 minutes per day beyond property boundary lines on which emission originates.		TDEC 1200-3-8-.01(2)
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Implement good construction management techniques (including sediment and erosion controls, vegetative controls, and structural controls) in accordance with the substantive requirements of Tennessee NPDES Stormwater Construction <i>General Permit No. TNR100000</i> to ensure Best Management Practices (BMPs) prevent migration of contaminants into surface water from storm water discharge. BMPs may be found at <a href="http://tnepsc.org/handbook.asp">http://tnepsc.org/handbook.asp</a> .	Dewatering or storm water runoff discharges from land disturbed by construction activity— disturbance of ≥1 acre of total land — <b>applicable</b>	TCA 69-3-108(j) TDEC 0400-40-10-.03(2) 40CFR 122.26(c)(1)(ii)(C) & (D)

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
	<p>Design, install and maintain effective erosion prevention and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed and maintained to:</p> <ul style="list-style-type: none"> <li>(1) Control stormwater volume and velocity to minimize soil erosion in order to minimize pollutant discharges;</li> <li>(2) Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points;</li> <li>(3) Minimize the amount of soil exposed during construction activity;</li> <li>(4) Minimize the disturbance of steep slopes;</li> <li>(5) Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;</li> <li>(6) Provide and maintain natural buffers as described in Section 4.1.2, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce pollutant discharges, unless infeasible;</li> <li>(7) Minimize soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and</li> <li>(8) Unless infeasible, preserve topsoil. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.</li> </ul>	Storm water discharges from construction activities –TBC	<p><i>General Permit No. TNR100000</i>  Section 4.1.1(1)-(8)</p>

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

<b>Action</b>	<b>Requirements</b>	<b>Prerequisite</b>	<b>Citation(s)</b>
Activities causing storm water runoff (e.g., clearing, grading, excavation)	<p>Discharge quality:</p> <p>(a) The construction activity shall be carried out in such a manner that will prevent violations of water quality criteria as stated in the Tennessee Rules, Chapter 0400-40-03-.03. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits or turbidity impair the usefulness of waters of the state for any of the uses designated for that water body by Tennessee Rules, Chapter 0400-40-04. Construction activity carried out in the manner required by this permit shall be considered in compliance with the Tennessee Rules, Chapter 0400-40-03-.03.</p> <p>(b) There shall be no distinctly visible floating scum, oil or other matter contained in the stormwater discharge.</p> <p>(c) The stormwater discharge must not cause an objectionable color contrast in the receiving stream.</p> <p>(d) The stormwater discharge must result in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life or fish and aquatic life in the receiving stream. This provision includes species covered under Subpart 1.3.</p>	Storm water discharges from construction activities –TBC	<p><i>General Permit No. TNR100000</i></p> <p>Section 5.3.2(a)-(d)</p>
<b>Waste Characterization – Primary Wastes (e.g., contaminated media and debris) and Secondary Wastes (e.g., wastewaters, spent treatment media, etc.)</b>			
Characterization of solid waste	Must determine if solid waste is excluded from regulation under 40 CFR 261.4(b); and	Generation of solid waste as defined in 40 CFR 261.2 and which is not excluded under 40 CFR 261.4(a) – <b>applicable</b>	40 CFR 262.11(a) TDEC 0400-12-01-.03(1)(b)(1)
	Must determine if waste is listed as hazardous waste under 40 CFR Part 261; or	Generation of solid waste which is not excluded under 40 CFR 261.4(a) – <b>applicable</b>	40 CFR 262.11(b) TDEC 0400-12-01-.03(1)(b)(2)
	<p>Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261 by either:</p> <p>(1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; <u>or</u></p> <p>(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.</p>	Generation of solid waste that is not listed in Subpart D of 40 C.F.R. Part 261 and not excluded under 40 C.F.R. § 261.4 – <b>applicable</b>	40 CFR 262.11(c) TDEC 0400-12-01-.03(1)(b)(3)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste	Generation of solid waste which is determined to be hazardous – <b>applicable</b>	40 CFR 262.11(d); TDEC 0400-12-01-.03(1)(b)(4)
Characterization of hazardous waste (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR 264 and 268.	Generation of RCRA-hazardous waste for storage, treatment or disposal – <b>applicable</b>	40 CFR 264.13(a)(1)



**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
Determinations for management of <i>hazardous waste</i>	Must determine if the hazardous waste has to be treated before land disposed. This is done by determining if the waste meets the treatment standards in 40 CFR .268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste.  This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.	Generation of RCRA hazardous waste – <b>applicable</b>	40 CFR 268.7(a)(1)(TDEC 0400-12-01-.10(1)(g)(1)(i)
	Must comply with the special requirements of 40 C.F.R. § 268.9 in addition to any applicable requirements in 40 CFR § 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment or disposal – <b>applicable</b>	40 CFR 268.7(a)(1)(TDEC 0400-12-01-.10(1)(g)(1)(i)
	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 et seq..  Note: This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of RCRA hazardous waste – <b>applicable</b>	40 CFR 268.9(a)(TDEC 0400-12-01-.10(1)(i)(1)
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – <b>applicable</b>	40 CFR 268.9(a)(TDEC 0400-12-01-.10(1)(i)(1)
<b>Waste Staging and Storage – Primary Wastes (contaminated media and debris) and Secondary Wastes (wastewaters, spent treatment media, etc.)</b>			
Temporary storage of <i>hazardous waste</i> in containers	A generator may accumulate hazardous waste at the facility provided that: <ul style="list-style-type: none"> <li>waste is placed in containers that comply with 40 CFR 265.171-173;</li> <li>the date upon which accumulation begins is clearly marked and visible for inspection on each container;</li> <li>container is marked with the words "hazardous waste"; and.</li> </ul>	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10— <b>applicable</b>	40 CFR 262.34(a); TDEC 0400-12-01-.03(4)(e)  40 CFR 262.34(a)(1)(i); TDEC 0400-12-01-.03(4)(e)(2)(i)(I)  40 CFR 262.34(a)(2); TDEC 0400-12-01-.03(4)(e)(2)(ii)  40 CFR 264.34(a)(3); TDEC 0400-12-01-.03(4)(e)(2)(iii)
	<ul style="list-style-type: none"> <li>container may be marked with other words that identify the contents.</li> </ul>	Accumulation of 55 gal. or less of RCRA hazardous waste at or near any point of generation— <b>applicable</b>	40 CFR 262.3(c)(1); TDEC 0400-12-01.03(4)(e)(5)(i)(III)

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
Use and management of <i>hazardous waste</i> in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers— <b>applicable</b>	40 CFR 265.171 TDEC 0400-12-01-.05(9)(b)
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 CFR 265.172 TDEC 0400-12-01-.05(9)(c)
	Keep containers closed during storage, except to add/remove waste.		40 CFR 265.173(a) TDEC 0400-12-01-.05(9)(d)(1)
	Open, handle and store containers in a manner that will not cause containers to rupture or leak.		40 CFR 265.173(b) TDEC 0400-12-01-.05(9)(d)(2)
Storage of <i>hazardous waste</i> in container area	Area must have a containment system designed and operated in accordance with 40 CFR 264.175(b).	Storage of RCRA-hazardous waste in containers with free liquids— <b>applicable</b>	40 CFR 264.175(a) TDEC 0400-12-01-.06(9)(f)(1)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA-hazardous waste in containers that do not contain free liquids — <b>applicable</b>	40 CFR 264.175(c) TDEC 0400-12-01-.06(9)(f)(3)
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [NOTE: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – <b>applicable</b>	40 CFR 264.178
Temporary on-site storage of remediation waste in staging pile (e.g., excavated soils)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated.  For purposes of this section, storage includes mixing, sizing, blending or other similar physical operations so long as intended to prepare the wastes for subsequent management or treatment.	Accumulation of <b><i>solid non-flowing hazardous remediation waste</i></b> (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 C.F.R. 260.10 – <b>applicable</b>	40 CFR 264.554(a)(1) TDEC 0400-12-01-.06(22)(e)1
	Staging piles may be used to store hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) based on approved standards and design criteria designated for that staging pile.  <b>NOTE:</b> Design and standards of the staging pile should be included in CERCLA Remedial Design document approved or issued by EPA.		40 CFR 264.554(b)

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
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Action	Requirements	Prerequisite	Citation(s)
Performance criteria for staging pile	<p>Staging pile must be designed to:</p> <ul style="list-style-type: none"> <li>facilitate a reliable, effective and protective remedy;</li> <li>must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (for example through use of liners, covers, run-off/run-on controls, as appropriate).</li> </ul>	Storage of remediation waste in a staging pile – applicable	<p>40 CFR. 264.554(d)(1)(i) and (ii)</p> <p>TDEC 0400-12-01-.06 (22)(e)4(i)</p>
Design criteria for staging pile	<p>In setting standards and design criteria must consider the following factors:</p> <ul style="list-style-type: none"> <li>Length of time pile will be in operation;</li> <li>Volumes of waste you intend to store in the pile;</li> <li>Physical and chemical characteristics of the wastes to be stored in the unit;</li> <li>Potential for releases from the unit;</li> <li>Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and</li> <li>Potential for human and environmental exposure to potential releases from the unit.</li> </ul>	Storage of remediation waste in a staging pile – applicable	<p>40 CFR. 264.554(d)(2)(i) –(vi)</p> <p>TDEC 0400-12-01-.06 (22)(e)4(ii)</p>
Temporary on-site storage of ignitable or reactive remediation waste in RCRA staging pile	<p>Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that:</p> <ul style="list-style-type: none"> <li>the remediation waste no longer meets the definition of ignitable or reactive under 40 CFR 261.21 or 40 CFR 261.23; and</li> <li>you have complied with 40 CFR 264.17(b); or</li> </ul> <p>Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.</p>	Storage of ignitable or reactive remediation waste in staging pile – applicable	<p>40 CFR. 264.554(e)(1) and (2)</p> <p>TDEC 0400-12-01-.06 (22)(e)5</p>
	Alternatively, instead of meeting the above requirements in 40 CFR 264.554(e)(1), the remediation waste may be managed to protect it from exposure to any material or condition that may cause it to ignite or react.		40 CFR 264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 CFR 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. 260.10) in staging pile – applicable	<p>40 CFR 264.554(f)(1)</p> <p>TDEC 0400-12-01-.06 (22)(e)6(i)</p>
	Must separate the incompatible waste or materials, or protect them from one another by using a dike, berm, wall or other device.		<p>40 CFR 264.554(f)(2)</p> <p>TDEC 0400-12-01-.06 (22)(e)6(ii)</p>
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 CFR 264.17(b).		<p>40 CFR 264.554(f)(3)</p> <p>TDEC 0400-12-01-.06 (22)(e)6(iii)</p>

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
Operational limits of a staging pile	Must not operate for more than 2 years, except when an operating term extension under 40 CFR 264.554(i) is granted.  <i>Note:</i> Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile	Storage of remediation waste in a staging pile – <b>applicable</b>	40 CFR 264.554(d)(1)(iii) TDEC 0400-12-01-.06 (22)(e)4(i)(III)
	Must not use staging pile longer than the length of time designated by EPA in appropriate decision document.		40 CFR 264.554(h)
Closure of staging pile of remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate.  Must decontaminate contaminated sub-soils in a manner that EPA determines will protect human and the environment.	Storage of remediation waste in staging pile in previously contaminated area – <b>applicable</b>	40 CFR 264.554(j)(1) and (2) TDEC 0400-12-01-.06 (22)(e)10
	Must be closed within 180 days after the operating term according to 40 CFR 264.258(a) and 264.111 or 265.258(a) and 265.111.	Storage of remediation waste in staging pile in uncontaminated area – <b>applicable</b>	40 CFR 264.554(k) TDEC 0400-12-01-.06 (22)(e)11(i)
<b><i>Treatment/Disposal of Wastes – Primary (e.g., contaminated media and debris) and Secondary Wastes (e.g., wastewaters, spent treatment media, etc.)</i></b>			
Disposal of RCRA-hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste – <b>applicable</b>	40 CFR 268.40(a) TDEC 0400-12-01-.10(3)(a)
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – <b>applicable</b>	40 CFR 268.40(e) TDEC 0400-12-01-.10(3)(a)(5)
Disposal of RCRA hazardous waste soil in a land-based unit	Alternative LDR treatment standards for contaminated soils - Must be treated according to the alternative treatment standards of 40 CFR 268.49(c) <u>or</u> according to the UTSs specified in 40 CFR 268.48 applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted hazardous soils – <b>applicable</b>	40 CFR 268.49(b) TDEC 0400-12-01-.10(3)(j)(2)

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Action	Requirements	Prerequisite	Citation(s)
Treatment of RCRA hazardous waste soil	Prior to land disposal, all "constituents subject to treatment" as defined in 40 CFR 268.49(d) must be treated as follows.	Treatment of restricted hazardous waste soils – <b>applicable</b>	40 CFR 268.49(c)(1) TDEC 0400-12-01-.10(3)(j)(3)(i)
	<b>For non-metals</b> (except carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90 percent reduction in total constituent concentrations, except as provided in 40 CFR 268.49(c)(1)(C).		40 CFR 268.49(c)(1)(A) TDEC 0400-12-01-.10(3)(j)(3)(i)(I)
Treatment of RCRA hazardous waste soil (cont'd)	<b>For metals</b> and carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90 percent reduction in total constituent concentrations as measured in leachate from the treated media (tested according to TCLP) <u>or</u> 90 percent reduction in total constituent concentrations (when a metal removal technology is used), except as provided in 40 CFR 268.49(c)(1)(C).		40 CFR 268.49(c)(1)(B) TDEC 0400-12-01-.10(3)(j)(3)(i)(II)
	When treatment of any constituent subject to treatment to a 90 percent reduction standard would result in a concentration less than 10 times the Universal Treatment Standard for that constituent, treatment to achieve constituent concentrations less than 10 times the universal treatment standard is not required. [Universal Treatment Standards (UTS) are identified in 40 CFR 268.48 Table UTS].		40 CFR 268.49(c)(1)(C) TDEC 0400-12-01-.10(3)(j)(3)(i)(III)
	In addition to the treatment requirement required by paragraph (c)(1) of 40 CFR 268.49, soils must be treated to eliminate these characteristics.	Treatment of soils that exhibit the hazardous characteristic of ignitability, corrosivity, or reactivity – <b>applicable</b>	40 CFR 268.49(c)(2) TDEC 0400-12-01-.10(3)(j)(3)(ii)
Disposal of RCRA hazardous debris in a land-based unit	Must be treated prior to land disposal as provided in 40 CFR 268.45(a)(1)-(5) unless EPA determines under 40 CFR 261.3(f)(2) that the debris no longer contaminated with hazardous waste <u>or</u> the debris is treated to the waste-specific treatment standard provided in 40 C.F.R. § 268.40 for the waste contaminating the debris.	Land disposal, as defined in 40 CFR 268.2, of RCRA-hazardous debris – <b>applicable</b>	40 CFR 268.45(a) TDEC 0400-12-01-.10(3)(f)
	Debris treated by one of the specified extraction or destruction technologies on Table 1 of 40 CFR 268.45 and which no longer exhibits a characteristic is not a hazardous waste and need not be managed in RCRA Subtitle C facility.  Hazardous debris contaminated with listed waste that is treated by immobilization technology must be managed in a RCRA Subtitle C facility.	Treated debris contaminated with RCRA-listed or characteristic waste – <b>applicable</b>	40 CFR 268.45(c) TDEC 0400-12-01-.10(3)(f)
Disposal of hazardous debris treatment residues	Except as provided in 268.45(d)(2) and (d)(4), must be separated from debris by simple physical or mechanical means, and such residues are subject to the waste-specific treatment standards for the waste contaminating the debris.	Residue from treatment of hazardous debris – <b>applicable</b>	40 CFR 268.45(d)(1) TDEC 0400-12-01-.10(3)(f)(4)

**Table 2**  
**Action-specific ARARs and TBC Guidance**  
**Southside Chattanooga Lead Site**  
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Action	Requirements	Prerequisite	Citation(s)
<b>Transportation of Wastes – Primary and Secondary Wastes</b>			
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR 171-180.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material —applicable	49 CFR 171.1(c)
Transportation of hazardous waste off-site	Must comply with the generator requirements of 40 CFR 262.20–23 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding and Sect. 262.40, 262.41(a) for record keeping requirements and Sect. 262.12 to obtain EPA ID number.	Preparation and initiation of shipment of RCRA hazardous waste off-site— applicable	40 CFR 262.10(h) TDEC 0400-12-01-.03(1)(a)8
Transportation of hazardous waste on-site	The generator manifesting requirements of 40 CFR 262.20–262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – applicable	40 CFR 262.20(f)
Management of samples (e.g., contaminated soils and wastewaters)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: <ul style="list-style-type: none"> <li>• The sample is being transported to a laboratory for the purpose of testing;</li> <li>• The sample is being transported back to the sample collector after testing; and</li> <li>• The sample collector ships samples to a laboratory in compliance with U.S. Department of Transportation, U.S. Postal Service, or any other applicable shipping requirements, including packing the sample so that it does not leak, spill or vaporize from its packaging.</li> </ul>	Generation of samples of hazardous waste for purpose of conducting testing to determine its characteristics or composition—applicable	40 CFR 261.4(d)(1) 40 CFR 261.4(d)(1)(i) 40 CFR 261.4(d)(1)(ii) 40 CFR 261.4(d)(2)
Waste left in place	Institutional controls are required and shall include, at a minimum, deed restrictions for sale and use of property, and securing the area to prevent human contact with hazardous substances which pose or may pose a threat to human health or safety.	Hazardous substances left in place that may pose an unreasonable threat to public health, safety, or the environment—TBC	TDEC 0400-15-01-.08(10)

**Notes:**

ARAR = applicable or relevant and appropriate requirement

CFR = Code of Federal Regulations

CWA = Clean Water Act of 1972

DOT = U.S. Department of Transportation

EPA = U.S. Environmental Protection Agency

RCRA = Resource Conservation and Recovery Act of 1976

HMR = Hazardous Materials Regulations

HMTA = Hazardous Materials Transportation Act

TBC = to be considered

TCA = Tennessee Code Annotated

TDEC = Rules of the Tennessee Department of Environment and Conservation, Chapter noted

UIC = Underground Injection Control

UTS = Universal Treatment Standard

USDW = Underground Source of Drinking Water

IDW = Investigation Derived Waste

**Table 3**  
**Location-specific ARARs and TBC**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Location	Requirement	Prerequisite	Citation
<b><i>Floodplains</i></b>			
Presence of Floodplains designated as such on a map <sup>1</sup>	Shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.	Federal actions that involve potential impacts to, or take place within, floodplains – TBC	Executive Order 11988 Section 1. <i>Floodplain Management</i>
	Shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain		Executive Order 11988 Section 2(a)(2) <i>Floodplain Management</i>
	Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.		Executive Order 13690 Section 2(c)
Presence of floodplain designated as such on a map	The Agency shall design or modify its actions so as to minimize <sup>2</sup> harm to or within the floodplain.	Federal actions affecting or affected by Floodplain as defined in 44 CFR 9.4 – relevant and appropriate	44 CFR 9.11(b)(1) <i>Mitigation</i>
	The Agency shall restore and preserve natural and beneficial floodplain values.		44 CFR 9.11(b)(3) <i>Mitigation</i>
	The Agency shall minimize: <ul style="list-style-type: none"> <li>Potential harm to lives and the investment at risk from base flood, or in the case of critical actions<sup>3</sup> from the 500-year flood;</li> <li>Potential adverse impacts that action may have on floodplain values.</li> </ul>		44 CFR 9.11(c)(1) and (3) <i>Minimization provisions</i>

<sup>1</sup> Under 44 CFR 9.7 *Determination of proposed action's location*, Paragraph (c) Floodplain determination. One should consult the FEMA Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (FBFM) and the Flood Insurance Study (FIS) to determine if the Agency proposed action is within the base floodplain.

<sup>2</sup> Minimize means to reduce to smallest amount or degree possible. See 44 CFR 9.4 *Definitions*.

<sup>3</sup> See 44 CFR 9.4 *Definitions*, *Critical action*. Critical actions include, but are not limited to, those which create or extend the useful life of structures or facilities such as those that produce, use or store highly volatile, flammable, explosive, toxic or water-reactive materials.

**Table 3**  
**Location-specific ARARs and TBC**  
**Southside Chattanooga Lead Site**  
**Chattanooga, Hamilton County, Tennessee**

Location	Requirement	Prerequisite	Citation
<i>Surface Waterbodies</i>			
Location encompassing <i>aquatic ecosystem</i> as defined in 40 CFR 230.3(c)	<p>No discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact.</p> <p>No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with 40 CFR 230.70 et seq. have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem.</p>	Action that involves the discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands – <b>applicable</b>	<p>40 CFR 230.10(a)</p> <p>40 CFR 230.10(d)</p>

**Notes:**

ARAR = applicable or relevant and appropriate requirement  
C.F.R. = *Code of Federal Regulations*  
E.O. = Executive Order

NWP = Nationwide Permit  
TBC = To Be Considered [guidance]  
U.S.C. = *United States Code*



Feasibility Study Cost Estimate				Total NPW Cost: \$25,870,620	
Project:	Chattanooga Lead Site	Alternative #:	2	Excavation-A	
Location:	Chattanooga, TN	Title:	Soil Excavation w T&D to Subtitle D Landfill		
Project Phase:	FFS	Project Number:	49086	Base Year:	2018
		Date:	9/18/2018	Revision:	1
Task Description:	Excavation of contaminated soils (0-2') in south Chattanooga, approximately 1,100 residential and communal properties, with disposal at a Subtitle D Landfill. Backfill of properties with clean fill after removal of contaminated soil. Site restoration of affected properties.				
Cost Basis:	Detailed estimate with subcontractor quotes				

Item	Qty.	Unit	Unit Cost	Note	Cost (\$)
Volume of Impacted Media to be Excavated: 203,000 yd <sup>3</sup>					
				Unit Cost (\$/yd3):	\$ 127
				Unit Cost (\$/property):	\$ 23,519

Capital Costs					
<b>1.0 Remedial Design</b>					
Remedial Design Professional Labor	1	ls	\$ 167,268		\$ 167,268
Remedial Design Travel	1	ls	\$ 870		\$ 870
Remedial Design/Bench Testing Subtotal:					\$ 168,138
<b>2.0 Mobilization/Demobilization of Equipment and Personnel</b>					
Mobilization/Demobilization of equipment and personnel (2/2 days)					
Labor	1	ls	\$ 197,738		\$ 197,738
Travel	1	ls	\$ 7,420		\$ 7,420
Materials/Equipment/ Subcontractors	1	ls	\$ 250,000		\$ 250,000
Mobilization Subtotal:					\$ 455,158
<b>3.0 Site Preparation</b>					
Utility protection, grubbing, clearing, pre excavation meeting, materials, removal of debris/garbage on properties					
Labor	1	ls	\$ 157,825		\$ 157,825
Travel	1	ls	\$ 11,250		\$ 11,250
Materials/Equipment/ Subcontractors	1	ls	\$ 823,500		\$ 823,500
Site Preparation Subtotal:					\$ 992,575
<b>4.0 Soil Excavation and Staging</b>					
Excavation of contaminated soils from estimated 1,100 residences and communal areas; staging of soils; transport and disposal at Subtitle D Non-Hazardous Waste Landfill; backfill; site restoration;					
Labor	1	ls	\$ 661,082		\$ 661,082
Travel	1	ls	\$ 105,750		\$ 105,750
Excavation Subcontractor Costs	1	ls	\$ 5,521,346		\$ 5,848,540
Transport & Disposal of Impacted Soil (Non-Hazardous)	1	ls	\$ 5,078,700		\$ 4,401,033
Backfill Subcontractor Costs	1	ls	\$ 2,376,792		\$ 2,252,250
Site Restoration	1	ls	\$ 2,374,100		\$ 3,805,000
					\$ 17,073,655
Subtotal - Capital Costs:					\$ 18,848,925
Capital Contingency	15%	of Capital Cost			\$ 2,827,339
Legal Fees, Licenses & Permits <sup>1</sup>	0.5%				\$ 108,381
Engineering & Administrative <sup>1</sup>	8%				\$ 1,734,101
Contractor Fee <sup>2</sup>	10%	of Capital Cost			\$ 2,351,875
Total Capital Cost:					\$ 25,870,620

<sup>1</sup> Applied to capital subtotal and contingency

<sup>2</sup> Applied to capital subtotal, contingency, fees, and E&A

# Feasibility Study Cost Estimate

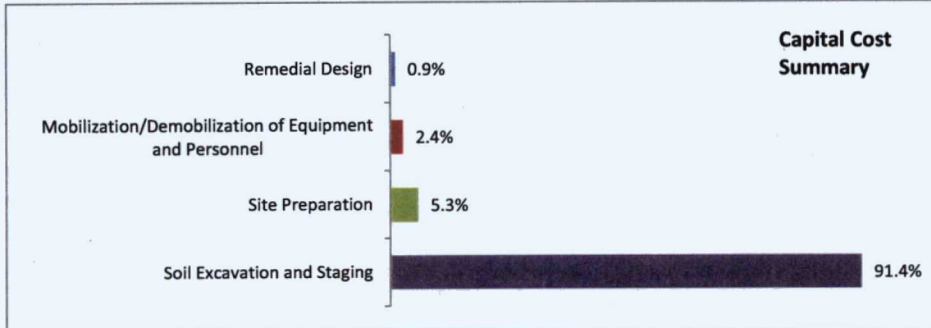
Project: **Chattanooga Lead Site**  
Location: **Chattanooga, TN**

Alternative #: **2**  
Title: **Excavation-A**  
**Soil Excavation w T&D to Subtitle D Landfill**



Note: Net Present Worth derived from summation of Modified Uniform Present Value (UPV\*).

Total NPW Cost Estimate: **\$ 25,870,600**



## General Assumptions

- Professional rates are averaged to reflect typical labor rates for personnel required for project.
- Cost basis derived from professional judgment and experience unless specified directly.
- Costs are derived to be (-30% to +50%)
- The cost estimated per property is not driven by volume of media excavated, but based on prelim quotes and experience with similar projects where costs per property were 15K to 25K. The volume of material used in the cost estimate is adjusted to reflect that price range.

## Excavation Worksheet

Manually transfer costs to summary sheet

S = Subcontractor; L = Labor; M = Material; R = Rental; O = Other Direct Charge; PD = Per Diem; T = Travel

Item	Basis	Code	Cat. #	Qty.	Unit	Unit Cost	Note	Subtotal (\$)
<b>Volume Calculations</b>								
Total Soil Volume to Excavate:		66,000	bcy					
Total Area to be Cleared:		891,000	ft <sup>2</sup>	20.45	acres			
Nominal Width of Excavation (per property):		20	ft	Area Check				
Nominal Length of Excavation (per property):		41	ft	891,000	ft <sup>2</sup>			
Average Depth to Water:		10	ft					
Average Depth of Excavation:		2	ft bls					
Deepest Excavation:		2	ft bls					
Depth of Clean Overburden:		0	ft					
Number of Track Excavators:		4						
Excavator Bucket Size:		0.95	cy					
Angle of Repose for Excavation Sidewalls:		90	degrees (to horizontal)				Sidewall Length:	
Percent Over-Excavation of Contaminated Soil:		100%					0.00	ft
Volume of Slope Cuts:		0	bcy				Approximate Sidewall Area:	
Total Volume Excavated:		66,000	bcy				322	ft <sup>2</sup>
Percent of Excavated Soils Contaminated:		100%						
Estimated Volume of Contaminated Soil:		66,000	bcy					
Soil Swell Factor:	Clay	1.25						
Safety Factor for Timeframe:		6.00						
Hours of Excavation/Day		3.00	hrs					
Estimated Timeframe for Excavation:		180.1	days	@	183.21	bcy/hr/excavator		
Non-Hazardous Soil Disposal:		82,500	lcy					
Estimated Timeframe for Backfill:		225	days	@	183.00	bcy/hr/excavator		
Estimated Work Timeframe:		409	days		58.4	wks		

Manually transfer costs to summary sheet

S = Subcontractor; L = Labor; M = Material; R = Rental; O = Other Direct Charge; PD = Per Diem; T = Travel

Item	Basis	Code	Cat.	#	Qty.	Unit	Unit Cost	Note	Subtotal (\$)
1.0 Remedial Design							Design/Bench/Pilot Scale Subtotal: \$ 168,138		
<u>Labor</u>									
P4		2	L	1	60	hr	\$ 142.38		\$ 8,543
P3		3	L	1	160	hr	\$ 103.78		\$ 16,604
P2		4	L	1	160	hr	\$ 72.04		\$ 11,526
Project Geologist		17	L	1	320	hr	\$ 103.78		\$ 33,209
Project Controls		32	L	1	40	hr	\$ 73.71		\$ 2,948
Staff Scientist		21	L	1	320	hr	\$ 60.29		\$ 19,293
Construction Supervisor		34	L	1	320	hr	\$ 92.44		\$ 29,581
Senior Project Manager		10	L	1	320	hr	\$ 142.38		\$ 45,562
Labor Subtotal: \$									167,268
<u>Travel</u>									
Plane		T		1	1	Rnd Trip	\$ 400.00		\$ 400
Per Diem		PD		2	1.0	day	\$ 140.00		\$ 280
Other		T		2	1.0	day	\$ 15.00		\$ 30
Vehicle		R		1	2	day	\$ 60.00		\$ 120
FOGM Vehicle		R		1	2	day	\$ 20.00		\$ 40
Travel Subtotal: \$									870
<u>Materials/Equipment/Subcontractors</u>									
Design Vendor		S		1	0	ls	\$ 25,000		\$ -
ODCs		M		1	0	ls	\$ 500		\$ -
									\$ -
									\$ -
2.0 Mobilization/Demobilization of Equipment and Personnel							Mobilization Subtotal: \$ 455,158		
Mobilization/Demobilization of equipment and personnel (2/2 days)									
<u>Labor</u>									
ConstructionManager <3mo		24	L	1	240	hr	\$ 112.86		\$ 27,087
Cost Estimator		26	L	1	120	hr	\$ 98.16		\$ 11,779
Project Engineer 2		16	L	1	320	hr	\$ 102.93		\$ 32,938
QA/QC Officer		27	L	1	120	hr	\$ 107.83		\$ 12,939
Staff Scientist 2		22	L	1	320	hr	\$ 46.24		\$ 14,798
Lead Scientist		19	L	1	320	hr	\$ 72.04		\$ 23,052
Construction Supervisor		34	L	1	320	hr	\$ 92.44		\$ 29,581
Senior Project Manager		10	L	1	320	hr	\$ 142.38		\$ 45,562
Labor Subtotal: \$									197,738
<u>Travel</u>									
Plane		T		1	6	Rnd Trip	\$ 400.00		\$ 2,400
Per Diem		PD		1	20.0	day	\$ 140.00		\$ 2,800
Other		T		1	20.0	day	\$ 15.00		\$ 300
Vehicle		R		1	24	day	\$ 60.00		\$ 1,440
FOGM Vehicle		R		1	24	day	\$ 20.00		\$ 480
Travel Subtotal: \$									7,420
<u>Materials/Equipment/Subcontractors</u>									
Alton Park Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Cowart Place Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Jefferson Heights Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Richmond Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Southside Gardens Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Highland Park Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
East Lake Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Oak Grove Mobilization/Demobilization		S		1	1	each	\$ 25,000		\$ 25,000
Miscellaneous		M		1	1	ls	\$ 50,000		\$ 50,000
Materials/Equipment/Subcontractors Subtotal: \$									250,000



### 3.0 Site Preparation

Site Preparation Subtotal: \$ 992,575

Utility protection, grubbing, clearing, pre excavation meeting, materials, removal of debris/garbage on properties

#### Labor

Construction Manager <3mo	24	L		100	hr	\$	112.86	\$	-
Project Controls	32	L	1	80	hr	\$	73.71	\$	5,897
Construction Supervisor	34	L	1	500	hr	\$	92.44	\$	46,221
QA/QC Officer	27	L	1	160	hr	\$	107.83	\$	17,253
Project Engineer 2	16	L	1	500	hr	\$	102.93	\$	51,466
-	1	L			hr	\$	-	\$	-
Procurement Manager	30	L	1	160	hr	\$	124.39	\$	19,902
Technician I	41	L			hr	\$	54.52	\$	-
Senior Project Manager	10	L	1	120	hr	\$	142.38	\$	17,086

Labor Subtotal: \$ 157,825

#### Travel

Plane	T			Rnd Trip	\$	400.00	\$	-
Per Diem	PD	2	25.0	day	\$	140.00	\$	7,000
Other	T	2	25.0	day	\$	15.00	\$	750
Vehicle	R	2	25	day	\$	60.00	\$	3,000
FOGM Vehicle	R	1	25	day	\$	20.00	\$	500

Travel Subtotal: \$ 11,250

#### Materials/Equipment/Subcontractors

##### Excavation Subcontractor

Preparation of HASP, QAPP, WMP	S	1	1	ls	\$	10,000	\$	10,000
Removal, Relocation, and/or Restoration of Temp Structures	S	1	1,100.0	each	\$	200	\$	220,000
Site Clearing and Protection of Trees	S	1	1,100.0	each	\$	345	\$	379,500
Temporary Erosion & Sediment Control	S	1	1100	each	\$	100	\$	110,000
Safety Kit (PPE, cones, temp fencing, tape 6 mil poly, etc.)	S	1	1	ls	\$	30,000	\$	30,000
Miscellaneous	M	1	1	ls	\$	50,000	\$	50,000
Trailer and utilities	M	1	12	month	\$	2,000	\$	24,000

Materials/Equipment/Subcontractors Subtotal: \$ 823,500

**4.0 Soil Excavation and Staging**

Soil Excavation and Staging Subtotal: \$ 17,327,302

Excavation of contaminated soils from estimated 1,100 residences and communal areas; staging of soils; transport and disposal at Subtitle D Non-Hazardous Waste Landfill; backfill; site restoration;

**Labor**

QA/QC Officer		27	L	1	260	hr	\$	107.83	\$	28,036
Construction Supervisor	Engineering Oversight	34	L	1	2600	hr	\$	92.44	\$	240,349
Project Engineer 2	Field Engineering	16	L	1	2600	hr	\$	102.93	\$	267,623
T2	Senior Technician	6	L	1	260	hr	\$	73.71	\$	19,165
Project Controls		32	L	1	90	hr	\$	73.71	\$	6,634
Staff Scientist		21	L	1	260	hr	\$	60.29	\$	15,676
Procurement Manager		30	L	1	260	hr	\$	124.39	\$	32,341
Senior Project Manager		10	L	1	360	hr	\$	142.38	\$	51,258

Labor Subtotal: \$ 661,082

**Travel**

Plane	T				Rnd Trip	\$	400.00	\$	-
Per Diem	PD	2		225.0	day	\$	140.00	\$	63,000
Other	T	2		225.0	day	\$	15.00	\$	6,750
Vehicle	R	2		225	day	\$	60.00	\$	27,000
FOGM Vehicle	R	2		225	day	\$	20.00	\$	9,000

Travel Subtotal: \$ 105,750

**Excavation Subcontractor Costs**

Air Monitoring	S	1		1,100	each	\$	1,085.00	\$	1,193,500
XRF Rental		2		12	months	\$	4,500.00	\$	108,000
Excavate Contaminated Soils	S	1		66,000	bcy	\$	40.00	\$	2,640,000
Soil Remediation with Vac Truck	S	1		22	bcy	\$	10,643.00	\$	234,146
Miscellaneous	M	1		1	ls	\$	150,000	\$	150,000
Surveying	S	1		1,100	total	\$	1,087	\$	1,195,700

Excavation Subtotal: \$ 5,521,346

**Transport and Disposal**

Transport & Disposal of Impacted Soil (Non-Hazardous)	S	1		78,375	bcy	\$	64.80	\$	5,078,700
Transport & Disposal of Impacted Soil (Hazardous)		1		4,125	lcy	\$	293.22	\$	1,209,533
	S	1		0	lcy	\$		\$	-

Transport &amp; Disposal Subtotal: \$ 6,288,233

**Backfill Subcontractor Costs**

Purchase Clean Fill	S	1		66,022	bcy	\$	-	\$	-
Backfill Clean Fill	S	1		66,022	bcy	\$	36.00	\$	2,376,792
	S				bcy	\$		\$	-

Backfill Subtotal: \$ 2,376,792

**Site Restoration**

Sodding	S	1		1,100.00	each	\$	800	\$	880,000
Water Placed Sod	S	1		1,100.00	each	\$	500	\$	550,000
Mulching / Vegetation / Fencing Replacement	S	1		1,100.00	each	\$	650	\$	715,000
Erosion Control Matting	S	1		1,100.00	each	\$	200	\$	220,000
Stormwater Controls	S	1		1	each	\$	9,100	\$	9,100

Restoration Subtotal: \$ 2,374,100

**Task Notes/Assumptions:**

## Appendix A



**STATE OF TENNESSEE**  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**  
Division of Remediation  
William R. Snodgrass TN Tower  
312 Rosa L. Parks Avenue, 14<sup>th</sup> Floor  
Nashville, Tennessee 37243

February 14, 2019

Franklin E. Hill, Director  
Superfund Division  
US EPA - Region 4  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303

**Subject: Record of Decision Concurrence Letter**  
**Southside Chattanooga Lead Site**  
**EPA ID # TNN000410686,**  
**TDEC/DOR ID # 79-845**

Dear Mr. Hill,

This letter supersedes the state's concurrence letter on the Southside Chattanooga site dated February 13, 2019, due to the addition of institutional control language to the draft ROD.

The Tennessee Department of Environment and Conservation (TDEC) Division of Remediation has reviewed the February 2019 Draft Record of Decision (ROD)-Early Action Soil Cleanup of Residential Properties submitted by the United States Environmental Protection Agency (EPA). The state concurs with the Selected Remedy of excavation and off-site disposal of lead contaminated soils in residential yards to reach the cleanup goal of 360 mg/kg, as outlined in the ROD.

This letter serves to clarify that concurrence with this ROD is not a determination, pursuant to Tennessee Code Annotated 68-212-225, by the commissioner of TDEC that land use restrictions are the appropriate remedial action. The need for institutional controls will be a joint EPA and TDEC decision determined on a property by property basis. This letter does not commit the commissioner of TDEC to implement any notice(s) of land use restrictions.

This concurrence letter does not obligate the State to a State match or other obligations required through a Superfund State contract (SSC). Those obligations can only be made through a SSC signed by the State officials required to obligate the State of Tennessee.

If you have any questions, please feel free to contact me at (615) 532-8599 or [Chris.P.Thompson@tn.gov](mailto:Chris.P.Thompson@tn.gov).

Sincerely,

A handwritten signature in black ink that reads "Chris Thompson" followed by a stylized flourish.

Chris Thompson  
Director  
Division of Remediation

cc: DOR/NCO  
DOR/CHEFO



## Appendix B

**Southside Chattanooga Lead Site  
Chattanooga, Tennessee  
Responses to Public Comments**

Identifier	Comment Summary	Response
<b>Charlotte Witt, email, November 15, 2018</b>		
CW-1	I say don't do anything, these people bought their homes let them pay to clean their own dirt. The City shouldn't pay this bill, besides the homeowners aren't making gardens in their yards. Our City should focus on other issues!!!	The Agency understands your concerns. However, remedial action is necessary to prevent children exposure to soil with lead concentrations that may result in unacceptable risk levels.
<b>Rosa Cantu, email, November 30, 2018</b>		
RC-1	The language used throughout all three documents is far above the literacy level of most Southside residents. At least six out of the eight neighborhoods affected are predominately Black and living below the poverty line. Per the Plain Writing Act of 2010, all government documents should use plain language that is directed at the literacy level of its audience.	<p>The Agency is assuming the three documents referenced in this comment are the interim Remedial Investigation Report, the focused Feasibility Study Report, and the Proposed Plan. To promote community engagement and understanding of the site activities, along with the referenced documents, the Agency published a two-page fact sheet with limited technical information. In addition, a public meeting was held to explain the Superfund remedy selection process; to discuss the site data and the preferred remedial alternative to address the site contamination.</p> <p>The Agency will continue its efforts to engage the community and to ensure that planned site activities are discussed and understood. The community is also encouraged to apply for a technical assistance grant (TAG), which will provide funding to retain a technical advisor (TA). The TA will assist the community with the understanding and interpretation of technical issues and documents.</p>

**Southside Chattanooga Lead Site  
Chattanooga, Tennessee  
Responses to Public Comments**

<b>Identifier</b>	<b>Comment Summary</b>	<b>Response</b>
RC-2	Documents need to be easily accessible by the visually impaired, blind, and Bilingual. When I had asked about this need, Mr. Tolliver had told me that these types of documents are only provided when specifically requested by the community. The EPA should proactively provide documents in large print, Braille, and Spanish translation. Without appropriate access, individuals that need these materials in this format do not even know about the issue.	Thank you for the comment. The Agency will ensure that future site-related documents particularly fact sheets are accessible by the visually impaired, blind, and bilingual.
Dawn Ford (unidentified female) and Mr. Raulston	Both participants inquired about the site cleanup level for lead being set at 360 mg/kg which is based on blood lead level target of 8 µg/dL instead of the CDC recommended 5 mg/dL.	As per EPA directives and guidance, bioavailability analysis was conducted. In addition, site-specific data was used in the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model. Target blood levels of 5, 6, 7, and 8 µg/dL were used in the model to calculate the site-specific remedial goal options (RGO). These target levels resulted in RGOs of 163, 228, 294, and 361 mg/kg respectively. The area background level for lead is approximately 200 mg/kg. Therefore, blood lead target of 5 µg/dL would result in cleanup level of 163 mg/kg, which would be below the estimated background level (200 mg/kg).

## **Appendix C**

**SOUTHSIDE CHATTANOOGA LEAD CONTAMINATION**  
**Public Meeting on 11/15/2018**

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8 PUBLIC MEETING FOR  
9 SOUTHSIDE CHATTANOOGA  
LEAD CONTAMINATION

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NOVEMBER 15, 2018

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**SOUTHSIDE CHATTANOOGA LEAD CONTAMINATION**  
**Public Meeting on 11/15/2018**

**Pages 2..5**

Page 2	Page 4
<p>1 MR. TOLLIVER: Welcome. Today</p> <p>2 we're having a meeting update for our Southside</p> <p>3 Chattanooga lead site, and I'm sure you all are</p> <p>4 pretty familiar. This is our third time here. So</p> <p>5 as we're going through this process, we want to make</p> <p>6 sure that you all are updated and you all stay</p> <p>7 updated, and also to give you any relevant</p> <p>8 information that you all need to know as we go</p> <p>9 through this process. Okay.</p> <p>10 Roberson is our project manager for this</p> <p>11 project. We also have Troy Keith with the state of</p> <p>12 Tennessee as well, and Becky Gorham with the</p> <p>13 Department of Health. Okay. And so if you have any</p> <p>14 questions, at the end -- we would like for you to</p> <p>15 hold off on your questions until after the</p> <p>16 presentation. You can take notes. And then we'll</p> <p>17 have a question and answer session at the end. We</p> <p>18 also have a court reporter here. So if you have a</p> <p>19 question or you have something to say, please raise</p> <p>20 your hand or stand up and acknowledge her, say your</p> <p>21 first and last name, so she can have that. We have</p> <p>22 to make sure we keep good records of who's speaking</p> <p>23 in our meeting. Okay.</p> <p>24 Bathrooms are outside by the desk to the</p> <p>25 left.</p>	<p>1 this is one of the challenges that we've been facing</p> <p>2 so far getting folks to sign off on our access</p> <p>3 authorization forms so that we can perform the</p> <p>4 sampling to determine whether or not the property is</p> <p>5 contaminated. So, once again, I would please ask</p> <p>6 you all to help us out by signing off on those</p> <p>7 access authorization forms. A tenant can sign them</p> <p>8 or the property owner can also sign on that access</p> <p>9 authorization form. So we have some of those forms</p> <p>10 here with us tonight. So if anybody here hasn't</p> <p>11 signed off on those forms, please at the end of the</p> <p>12 meeting stop by the table and we have some blank</p> <p>13 copies that you can please sign off on that. And we</p> <p>14 would greatly appreciate that. And if for whatever</p> <p>15 reason you don't get to it tonight, you can access</p> <p>16 it on our website.</p> <p>17 Well, the address is super long. So I'm</p> <p>18 not going to ask you to memorize that. But,</p> <p>19 however, if you were to simply Google Southside</p> <p>20 Chattanooga lead site, that will come up. And from</p> <p>21 there you will be able to download that form.</p> <p>22 Complete it. And you can send it back to us either</p> <p>23 by e-mail, mail, and facsimile as well. My phone</p> <p>24 number is there. If for whatever reason you can't</p> <p>25 find a way to send it to us, give me a call and I</p>
Page 3	Page 5
<p>1 And, Roberson, your turn.</p> <p>2 MR. JOSEPH: Thank you, Ron.</p> <p>3 MR. TOLLIVER: Uh-uh.</p> <p>4 MR. JOSEPH: Good evening. Well, let</p> <p>5 me just introduce myself one more time. My name is</p> <p>6 Roberson Joseph. I'm with the EPA. And my office</p> <p>7 is based down in Atlanta. And I'm the project</p> <p>8 manager for the site. Before we get started I want</p> <p>9 to take a few seconds and want to thank a couple of</p> <p>10 folks that have been helping me quite a bit</p> <p>11 throughout the project. Certainly Troy has been</p> <p>12 instrumental with his support. And Becky as well</p> <p>13 has been coming around and helping us out. So I</p> <p>14 don't think I can go forward without acknowledging</p> <p>15 my supervisor who's in the room. His name is</p> <p>16 Mr. Scott Young. And I also have my risk assessor.</p> <p>17 I don't know what I would do without her. She's</p> <p>18 sitting in the back. Her name is Sydney Chan.</p> <p>19 Good.</p> <p>20 All right. There are a couple of quick</p> <p>21 housekeeping things that I want to touch on very</p> <p>22 quickly. And this is something that is extremely</p> <p>23 important to us. Because as you all know, we can't</p> <p>24 really step on anybody's property and start doing</p> <p>25 soil sampling without getting authorization. And</p>	<p>1 will provide you with all of the information that</p> <p>2 you need.</p> <p>3 Why are we here tonight? Well, part of</p> <p>4 the reason why we're here is because I want to</p> <p>5 discuss with you all the proposed option we want to</p> <p>6 basically adopt so that we can clean up the lead</p> <p>7 contamination from those residential yards. And</p> <p>8 then also another thing that is extremely important</p> <p>9 is for the community participation. That's one of</p> <p>10 the key aspects of the superfund program. Your</p> <p>11 input, your assistance is extremely important to us.</p> <p>12 We want you to participate. We want you to tell us</p> <p>13 what you think about what we plan to do. So that's</p> <p>14 why, again, we have a number of documents on our</p> <p>15 website where you can go in and read a little bit</p> <p>16 about the site and what we plan to do. And</p> <p>17 certainly, again, provide us with your input. That</p> <p>18 is extremely important to us.</p> <p>19 So in terms of your participation, what do</p> <p>20 we do and what the expectations are, about two weeks</p> <p>21 ago, November the 1st, we issued a proposed plan.</p> <p>22 So basically the proposed plan, what it is, it's a</p> <p>23 21 or 22 page document. There are number of pages</p> <p>24 in there as well. So that just presents all the</p> <p>25 rationale, the reasons why we propose to clean up</p>

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<p style="text-align: right;">Page 6</p> <p>1 the site the way we plan to clean it up. And, 2 again, what we need from you is feedback, questions, 3 comments, or whatever that might be so that we can 4 ensure that we are all on the right track. Again, 5 we don't want to go along all by ourselves. We need 6 your input.</p> <p>7 So the proposed plan that was issued on 8 November the 1st, there is a 30-day period on that 9 that started back on the 1st. And the last day 10 would be November the 30th. So at the end of that 11 30-day period, we hopefully will get all of the 12 questions and comments and input from you. And what 13 we will do, we will address all of those comments in 14 our record of decision. And the record of decision 15 is nothing else but a legal document that summarized 16 the remedy that will be implemented. And, again, 17 that remedy will not be selected and not be 18 finalized not until we hear from you all.</p> <p>19 And, again, like I said, those comments 20 can be submitted in several different ways. But 21 primarily by mail or by e-mail. My e-mail address 22 and phone number and contact information will be 23 provided at the end. That will be the ways you can 24 submit those comments to us.</p> <p>25 And responses to the comments that we</p>	<p style="text-align: right;">Page 8</p> <p>1 participation. I've discussed with you your 2 participation. But now the next thing is what do we 3 plan to do and how do we plan to address the lead 4 contamination that was found at this site?</p> <p>5 Here are the primary components of the 6 strategy already that we plan to implement so that 7 we can clean up the contaminated residential yards. 8 What we plan to do is, certainly, after we sample 9 and if the property were determined to be 10 contaminated, meaning that we have found lead at 11 concentrations at both our cleanup level of 360 12 milligrams per kilogram, so that probably would be 13 then typed for clean up. So once it's typed for 14 cleanup, what we will then do to clean it up 15 consists of just the excavation of the soil. And 16 once we've excavated that contaminated soil, we will 17 transport it and dispose of it at a permitted 18 landfill. And any excavated areas will be 19 backfilled and those areas as well will be restored 20 and any fence or sod or anything else on the 21 property that has been impacted by our work, we'll 22 be sure that we restore those and to repair it.</p> <p>23 Yes, sir?</p> <p>24 MR. KEASLER: So you will plan to do 25 that for any property that you've drilled and found</p>
<p style="text-align: right;">Page 7</p> <p>1 receive, like I said just a little while ago, will 2 be included in responsiveness summary, which is a 3 section of that record of decision, which is the 4 legal document, again, summarizing what we will do 5 to address the contamination.</p> <p>6 And we have a number of documents that we 7 use to form our decision in terms of how we plan to 8 move forward and clean up the property -- I mean, 9 the properties. So those documents, they can be 10 found, one, on the website, and certainly right here 11 locally at your local public library, the 12 Chattanooga branch located at 921 39th Street. I 13 believe it's not too far from here.</p> <p>14 And, again, like I said, also the proposed 15 plan, which is that 22 or so page document 16 summarizing the remedy that we propose to implement 17 to clean up the site is also on our website.</p> <p>18 My strategy has always been really, you 19 know, start from the end. Where do we want to go? 20 What are we here for? And then providing you with 21 some supporting information, background information, 22 to let you know exactly how we would get where we 23 get. Again, like I said, the two objectives of 24 today's meeting was to share with you what we plan 25 to do, and certainly to ask you for your</p>	<p style="text-align: right;">Page 9</p> <p>1 the core samples were contaminated?</p> <p>2 MR. JOSEPH: That is correct.</p> <p>3 MR. KEASLER: Suppose there's a 4 drilling here and a drilling there and the property 5 in between did not have one --</p> <p>6 MR. JOSEPH: Uh-huh.</p> <p>7 MR. KEASLER: -- and they were both 8 contaminated, you wouldn't do anything to the 9 property in between?</p> <p>10 MR. JOSEPH: Well, if the property is 11 located where it's located at and we don't have 12 access to sample to determine whether it's 13 contaminated or not, that's when our hands will be 14 somewhat tied. That's when we'll really need your 15 help.</p> <p>16 MR. KEASLER: And how long does that 17 -- the government takes a long time to do these 18 things. So if you say go on December 1st of this 19 year, when would that process be completed?</p> <p>20 MR. JOSEPH: Well, I think that will 21 be the slide before the last slide of my 22 presentation where I discuss the next steps and tell 23 you what will be happening. But to answer your 24 question, what I can probably say is, yes, there's a 25 process. And as part of that process after we have</p>

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<p style="text-align: right;">Page 10</p> <p>1 selected a remedy, we get your input, which</p> <p>2 certainly requires us to, again, to bring in this</p> <p>3 heavy equipment to start the excavation, we have to</p> <p>4 do some design. And the design, you can submit your</p> <p>5 specifications so that our contractor will know what</p> <p>6 exactly to do and they will have regulations and</p> <p>7 norms that they would have to follow. So the</p> <p>8 plan --</p> <p>9 MR. KEASLER: How many years?</p> <p>10 MR. JOSEPH: Well, now, the other</p> <p>11 thing is --</p> <p>12 UNIDENTIFIED MALE: We're going to</p> <p>13 take questions at the end. I think if you listen to</p> <p>14 the rest of the presentation, a lot of your answers</p> <p>15 may be answered. So if we could hold our questions</p> <p>16 to the end, we'll have a little bit more to base our</p> <p>17 questions on.</p> <p>18 MR. JOSEPH: I'll just finish with</p> <p>19 that question and we'll just follow the process</p> <p>20 then.</p> <p>21 As of now we've submitted that there are</p> <p>22 about 3600 properties that need to be investigated.</p> <p>23 So needless to say that is going to take a bit of</p> <p>24 time to get to all of those 3600 properties. But,</p> <p>25 now, the plan for now is hopefully we are going to</p>	<p style="text-align: right;">Page 12</p> <p>1 the sites, heavy metal. It's lead. We don't have a</p> <p>2 real long list of options. We are somewhat limited</p> <p>3 in the number of options that can be implemented.</p> <p>4 And these are the limited options that we evaluated.</p> <p>5 And, again, I will tell you exactly what we intend</p> <p>6 to do and when that will happen.</p> <p>7 Site description: Well, since you all are</p> <p>8 probably all locals you know the site probably</p> <p>9 better than I do. But the site is right around here</p> <p>10 in our backyard in Chattanooga. And the property</p> <p>11 consists of residential properties in neighborhoods</p> <p>12 including Cowart Place, Jefferson Heights, Southside</p> <p>13 Gardens, Richmond, Highland Park, Oak Grove, and</p> <p>14 East Lake where lead bearing material from past</p> <p>15 foundry operations had been deposited. And I don't</p> <p>16 know if you can actually see that map that I have in</p> <p>17 there basically showing different neighborhoods that</p> <p>18 are included. So right up here is Cowart Place,</p> <p>19 Southside Gardens, Jefferson Heights, Richmond,</p> <p>20 Alton Park, Highland Park, Oak Grove, and East Lake.</p> <p>21 Those are the neighborhoods that we plan to address</p> <p>22 as part of this cleanup.</p> <p>23 So how did we get involved? How did we</p> <p>24 end up knowing that there were some issues of some</p> <p>25 contamination that needed to be addressed that</p>
<p style="text-align: right;">Page 11</p> <p>1 wait (inaudible) properties to start moving forward</p> <p>2 in cleaning up properties. We're hoping by late</p> <p>3 spring, early summer of this year we will start some</p> <p>4 excavation. That's the plan.</p> <p>5 MR. KEASLER: Thank you.</p> <p>6 MR. JOSEPH: You're welcome.</p> <p>7 Okay. Well, I touched on community</p> <p>8 participation and I also discussed the primary</p> <p>9 components of the remedy. And like I said, I</p> <p>10 usually backtrack by saying, okay, now, how do we</p> <p>11 get where we get? So what I'm going to do now is</p> <p>12 just touch on some very brief topics, such as the</p> <p>13 description of the site and some perspective. And</p> <p>14 then also, another component of the overall process</p> <p>15 that this gentleman was talking about, the superfund</p> <p>16 process.</p> <p>17 Well, prior to implementing any remedy,</p> <p>18 there are a few steps that we have to take. And</p> <p>19 some of those steps would include performing what we</p> <p>20 call remedial investigation. And on top of that we</p> <p>21 also have to perform a feasibility study. I will</p> <p>22 present some brief summary of some of those steps,</p> <p>23 what we have done so far. And, again, I will circle</p> <p>24 back to the cleanup options that were enumerated.</p> <p>25 Considering the nature of contamination at some of</p>	<p style="text-align: right;">Page 13</p> <p>1 needed to be taken care of there? Well, the whole</p> <p>2 thing kind of started back in 2011. And that's when</p> <p>3 there was a local resident went to the ER with some</p> <p>4 severe abdominal pain. And at that point some blood</p> <p>5 work was performed. And it turns out that it was</p> <p>6 some, you know, really high level of lead was found</p> <p>7 in that individual. And at that point, they reached</p> <p>8 out to us and in collaboration with TDEC, we</p> <p>9 initiated a somewhat limited study right along Read</p> <p>10 and Mitchell Avenue. And the soil samples that we</p> <p>11 collected there did turn out -- the results were</p> <p>12 actually quite high. And I believe the highest</p> <p>13 concentration was 4,000 milligrams per kilogram.</p> <p>14 That was pretty high. And as a result, back in 2013</p> <p>15 EPA initiated a cleanup program in which 84 yards</p> <p>16 were excavated along Read and Mitchell Avenue.</p> <p>17 And we say way, well, what's happening</p> <p>18 then? Is that contamination contained along Read</p> <p>19 and Mitchell Avenue or is it all over town? Then we</p> <p>20 say, well, the only way to find out is by doing some</p> <p>21 additional sampling so that we can see exactly what</p> <p>22 is the actual extent of that contamination.</p> <p>23 Back in 2016, again, working with TDEC, we</p> <p>24 initiated a very extensive soil sampling program.</p> <p>25 And at that point the primary objective of that</p>



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<p style="text-align: right;">Page 14</p> <p>1 sampling program were, number one, were to obtain 2 soil samples on Read and Mitchell Avenue, and then 3 also if it was not contained within Read and 4 Mitchell, we also -- we said, well, let's find out 5 much contamination that we have and at the same time 6 determine whether or not that site would be 7 (indiscernible) for listing on the National 8 Priorities List.</p> <p>9 And the primary reason for that was 10 because that without (indiscernible) on the NPL, our 11 resources would be somewhat limited. However, by 12 placing the site on the NPL, then we can use 13 superfund resources, dollars and manpower and 14 everything else so that we can address the 15 contamination.</p> <p>16 So cleaning up the site is just something 17 that we just get up one morning and then the next 18 morning we said, well, let's get some shovel and get 19 a wheelbarrow and, you know, soil and clean it up. 20 Absolutely not. There is a process that we have to 21 follow. Basically that's just by law. There are a 22 few steps that we have to take so that we ensure 23 that whatever we do is scientifically sound, and 24 certainly, again, like I said at the very beginning, 25 so that we can get you all involved and get your</p>	<p style="text-align: right;">Page 16</p> <p>1 are we trying to achieve? And once we take that 2 step back and say, okay, this is what we're going to 3 try to do. Then obviously the next step is, well, 4 how we will do it. How do you do it? And what kind 5 of technologies that are available to you so that we 6 can really achieve the (indiscernible) for yourself?</p> <p>7 So now when performing that feasibility 8 study, like I said a little while ago, considering 9 the nature of the contaminate that we're dealing 10 with at this site, our (inaudible). And they were 11 basically just two primary remedies that we looked 12 up. Well, I think that will be on the next slide.</p> <p>13 So right here, what do I have, is just a 14 brief summary of all of the sampling that we 15 conducted during remedial investigation. So, again, 16 there were some 10 neighborhoods that we assessed. 17 Meaning that we collected soil samples in 10 18 different neighborhoods throughout downtown 19 Chattanooga. And out of those 10 neighborhoods, 20 there were two of them where we found absolutely no 21 contamination. However, 8 of them were impacted by 22 lead contamination.</p> <p>23 And, again, as part of the feasibility 24 study, we need to, you know, take a step back and 25 try to figure exactly what is the magnitude of the</p>
<p style="text-align: right;">Page 15</p> <p>1 input and your feedback and make sure that we're 2 doing the right thing.</p> <p>3 And one of those steps is to perform a 4 remedial investigation. And your (indiscernible) of 5 that remedial investigation it twofold. Number one, 6 is to define the nature and extent of the 7 contamination. Basically trying to figure exactly 8 what type of contaminants that we're dealing with 9 and how far does the contamination go. And as part 10 of that remedial investigation phase as well the 11 other thing that we do is try to determine what kind 12 of risks will people or ecological receptors will 13 face by being exposed to that contamination.</p> <p>14 We did that starting in August of last 15 year -- of 2017. And the next step -- after 16 completing the remedial investigation, the very next 17 thing that we do is perform what we call a 18 feasibility study. And the goals of that 19 feasibility study is to develop what we call 20 remedial actual objectives, or RAOs based on the 21 results of the risk assessment. So in a nutshell 22 what that means is, okay, well, if we know that we 23 have contamination somewhere, then we need to take a 24 step back and try to figure out exactly, well, what 25 are we going to do and what will our goals be? What</p>	<p style="text-align: right;">Page 17</p> <p>1 problem that we're dealing with. So what we did do 2 then is because the remedial investigation is still 3 somewhat ongoing because we haven't sampled all of 4 the properties throughout those 10 neighborhoods 5 that we believe are impacted. So now what we had to 6 do was we had to make some assumptions and try to 7 figure exactly, well, how many properties do we 8 think that are contaminated so that we can come up 9 with a cost estimate, then we can know exactly know, 10 well, how much it's going to cost us to clean up the 11 contamination.</p> <p>12 Based on our evaluation and analysis it 13 turns out that, well, we realize that there are 14 somewhat roughly about 3600 properties that would 15 need to be assessed. That doesn't mean that 3600 16 properties are contaminated. No, not at all. 3600 17 properties that we need to collect soil samples 18 from. And then based on the results of those soil 19 samples that were collected, then we will determine 20 exactly how many properties are contaminated.</p> <p>21 And for cost estimating purposes, we 22 looked at the existing information that we have so 23 far. And it turns out that about roughly 30 percent 24 of all the properties that we have sampled so far 25 are contaminated. So we project out of those 3600</p>

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<p style="text-align: right;">Page 18</p> <p>1 properties that we estimated roughly about 1100 or 2 1200 of those properties will then require some sort 3 of remediation. And, again, the threshold for 4 determining which property would need to be cleaned 5 up or not is that magic number here, 360 milligrams 6 per kilogram. So we collect the soil sample. We 7 test it. And the result turn out to be at least 360 8 milligram per kilogram, then that property would be 9 tagged for cleanup. If the concentrations is less 10 than that 360, then we consider that property to be 11 clean and, therefore, no further action would be 12 necessary.</p> <p>13 And there is a very long process with 14 coming up with that number. I will not bore you 15 with that entire process. But what I will tell you 16 is with some scientific model and then we come up 17 with some estimated risks. And based on those 18 risks, we concluded that that number, that 360 19 milligram per kilogram is really what we considered 20 as our cleanup level. Basically the threshold we 21 would determine what's clean and what's 22 contaminated.</p> <p>23 And speaking of risks, what did turn out 24 during the remedial investigation, it turns out 25 that, well, we have seen very high concentrations of</p>	<p style="text-align: right;">Page 20</p> <p>1 at least 8 milligrams per deciliters.</p> <p>2 Okay. Well, again, one or two slides 3 before I did mention that part of the feasibility 4 study process is to determine exactly, well, what 5 are you trying to achieve? What's your goal? And 6 that's exactly what we said that we're trying to do. 7 What we're trying to do is prevent kids from playing 8 with that contaminated dirt. That's our goal. 9 Because we know based on our calculations if they 10 were to be playing with it, there is a 90 percent 11 chance that their lead blood level would end up 12 being greater than that 8 milligrams per deciliters. 13 So we don't want that. And that's exactly why we 14 said that, yes, something needs to be done.</p> <p>15 So what alternatives or technologies that 16 we evaluated and we looked at doing the feasibility 17 study in order to select our option. Again, 18 considering the nature of the contaminant, we are 19 dealing with heavy metals. And there aren't that 20 many options out there to address this type of 21 contamination. And at a bare minimum by law, we are 22 required to look at, well, what if we don't do 23 anything a all, as one of the options. And we 24 looked at that. And we said, well, if we were not 25 to anything at all, what would then happen at a bare</p>
<p style="text-align: right;">Page 19</p> <p>1 lead in some of those yards. And my risk 2 assessor -- well, that's why I gave a shout out to 3 my risk assessor in the back, Sydney Chan. In all 4 that there was a 90 percent probability that a child 5 was exposed or playing in those contaminated yards 6 would end up with blood lead level at least equal to 7 or even greater than 8 milligrams per deciliters. 8 So that's a threshold that we -- it's something that 9 we really don't want. I don't want to say it's not 10 safe.</p> <p>11 UNIDENTIFIED FEMALE: It's not safe. 12 MR. JOSEPH: The threshold -- 13 UNIDENTIFIED FEMALE: The CDC is 5. 14 MR. JOSEPH: I'm sorry? 15 UNIDENTIFIED FEMALE: The CDC level 16 is 5. 17 MR. JOSEPH: Well, that's CDC, but 18 EPA we use -- there is a range that we use. 19 Anywhere from 5 to 10. And, again, I'm not a risk 20 assessor. I will not dive too deeply into that. 21 But my risk assessors, they really use that model 22 and they came up with that risk evaluation where, 23 again, like I said, there was a 90 percent 24 probability that a child, you know, was playing with 25 that contaminated soil and had a blood lead level of</p>	<p style="text-align: right;">Page 21</p> <p>1 minimum we would have to put some controls in place 2 so that we can hopefully mitigate that exposure to 3 the contaminated soil. And to put those controls in 4 place, we figured that it probably would cost us 5 roughly about \$88,000. But, again, that is not an 6 option. But we're simply obligation by law to 7 consider it as one of the options, or basically as a 8 baseline, to paraphrase it this way.</p> <p>9 But, again, because of the nature of the 10 contamination that we have out there, we don't have 11 too many choices. And what we're proposing and what 12 we plan to do is what I discussed earlier, 13 excavating the contaminated material, transport it 14 and dispose of it at a permanent landfill. And, 15 again, with full authorization of the site. Like I 16 said, there are some 3600 properties that we need to 17 sample. And to date we are up to roughly about 400 18 properties that have been sampled so far. So we 19 have a little bit of ways to go. And we estimated 20 that to implement that remedy, meaning that, to 21 excavate all of the contaminated yards and restore 22 the, that would cost us roughly about \$26 million.</p> <p>23 So where do we go from here? What are the 24 next steps? The next steps are -- like I said at 25 the beginning, we issued a proposed plan basically</p>

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<p align="right"><b>Page 22</b></p> <p>1 sharing with you our thoughts in terms of what we 2 plan to do, what we're thinking about doing to 3 address the contamination. But, again, there aren't 4 that many options. And there is a 30-day period on 5 that proposed plan. That started on the 1st and 6 will end on the 30th of the month. Please, submit 7 your comments to us by e-mail, by mail, fax, either 8 way. We want to hear from you. And after we get 9 all of your comments, we'll certainly consider them, 10 and we will issue what we call a record of decision. 11 And as of now we are looking at by the end of 12 December, but definitely no later than the end of 13 January to issue that record of decision. And 14 responses to all of the comments that we receive 15 during that period, will then be addressed in a 16 section of that record of decision called 17 responsiveness of summary. And after sharing the 18 record of decision, the next step will be to present 19 that site to National Priority Panel. Basically the 20 goal there then is to get money, to get necessary 21 funding so that we can implement the remedy that we 22 said we would implement.</p> <p>23 And in term of timetable, what we're 24 looking at, the National Priory Panel, they meet 25 only twice a year. Actually I think they are</p>	<p align="right"><b>Page 24</b></p> <p>1 information, all the documents, and everything else. 2 Like I said, the access authorization forms, the 3 proposed plan. And if you're looking for anything 4 on our website, my phone number is right there. 5 404-562-8891. I'm only a phone call away. And I 6 will do whatever I can to address any comments and 7 concerns that you may have.</p> <p>8 So with that, I will turn it over to Becky 9 from the Department of Health who will probably 10 share some ideas with you in terms of, you know, 11 what can we all do to prevent, you know, basically 12 exposure to lead.</p> <p>13 MS. GORHAM: Good evening. I'd like 14 to thank Robenson for inviting me to be here with 15 you this evening. As he said, I'm with the 16 Tennessee Department of Health. And I have come 17 here tonight to tell you whey it is important that 18 we're doing the things that we're doing, that EPA, 19 the work that they're doing here, why it's so 20 important.</p> <p>21 Primarily our most concern is the 22 children. Any exposure the children has can be more 23 serious than the same exposure to an adult because 24 their bodies are smaller. And so, therefore, it has 25 greater effects on the children. So our primary</p>
<p align="right"><b>Page 23</b></p> <p>1 meeting right now as we speak up in Seattle. And 2 the next meeting will be around February, March, 3 time frame. And the goal, again, because we'll have 4 our record of decision issued somewhere around, you 5 know, end of December and January, then we'll be 6 ready to present to the National Priority Panel so 7 that we can get the necessary funding in February 8 and March time frame.</p> <p>9 So once we get the funding, the next step 10 would then be to develop a design. The design for 11 this site would be somewhat, you know, 12 straightforward. Because, again, what we're looking 13 at is just excavating the contaminated material and 14 dispose of it off site. And once we've done the 15 design and that's when we start seeing those heavy 16 equipment in your back yard digging up the 17 contamination. And the plan -- at least based on my 18 projections, by late spring or early summer of this 19 year that's when I'm hoping we'll have (inaudible). 20 So that said, yes, I did promise you that. 21 I will project my contact information. So there it 22 is. It's all there. But, again, the best way to 23 get all of that information is just Google the site. 24 Southside Chattanooga Lead Site. And once you 25 Google it, then you'll find all our contact</p>	<p align="right"><b>Page 25</b></p> <p>1 concern is with the children.</p> <p>2 And here you see on this slide some of the 3 health effects that can come from children being 4 exposed to lead. Some of the serious things, damage 5 to their brain and their nervous system. We have 6 seen slow growth and development. Learning problems 7 and behavior problems. Some of these things can 8 impact their lives for quite some time. So it's 9 very important that we take this seriously and that 10 we do the best we can to protect our children from 11 exposure to lead.</p> <p>12 Also, you'll see here there's also some 13 symptoms and some problems that can happen with 14 adults that are exposed to lead. High blood 15 pressure, digestive problems, as you heard earlier, 16 the gentleman who was ill early on in this process. 17 You know, he was having some problems there. So 18 there are certainly some issues that could happen to 19 adults as well.</p> <p>20 Perhaps one of the most important things 21 that could happen, if you're pregnant, these are 22 some of the issues: Put you at risk for a 23 miscarriage, cause your baby to be born earlier or 24 small, and it can also impact the unborn baby's 25 brain, kidneys, and nervous system. And also cause</p>

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<p style="text-align: right;">Page 26</p> <p>1 learning behavior problems there as well.</p> <p>2 So what is the most important thing that</p> <p>3 you can do, other than what's going on here with the</p> <p>4 folks from EPA tonight is have your child testes.</p> <p>5 Have their blood lead level tested to make sure that</p> <p>6 they are not exposed to lead, that they are not</p> <p>7 going to have problems there. And here are a couple</p> <p>8 of phone numbers for your local health department</p> <p>9 here in Chattanooga and also the number at the</p> <p>10 bottom is the number for our childhood lead poison</p> <p>11 prevention program with the State of Tennessee.</p> <p>12 So, also, in addition to having their</p> <p>13 blood lead level tested, you can also -- if you</p> <p>14 suspect that your soil is contaminated, you</p> <p>15 certainly want to protect your family. So some of</p> <p>16 the things here that you can do, wash and peel</p> <p>17 fruits if you grow your vegetables in your backyard.</p> <p>18 We have some information on our back table back here</p> <p>19 about gardening, safe gardening where you have lead</p> <p>20 contaminated soil. But be sure and wash and peel</p> <p>21 your fruits and vegetables, and certainly the root</p> <p>22 crops.</p> <p>23 When you come in the door, take off your</p> <p>24 shoes or make sure you try and keep the dust from</p> <p>25 the soil from outside. Don't bring it in your</p>	<p style="text-align: right;">Page 28</p> <p>1 substances and disease registry. So we will be</p> <p>2 doing that as well. If you want to review our</p> <p>3 document and comment on it as well, I have a sign-up</p> <p>4 sheet back here on the table. We'd love to have</p> <p>5 your name and address so we can send that to you</p> <p>6 when it's ready.</p> <p>7 So if you have any questions, we have more</p> <p>8 information about lead on our healthy homes website</p> <p>9 and other healthy homes topics as well. So check</p> <p>10 out our website there.</p> <p>11 MR. TOLLIVER: Okay. All right. Now</p> <p>12 we have our Q &amp; A session. So we had a lot of</p> <p>13 information.</p> <p>14 Thank you, Roberson for breaking it down.</p> <p>15 I hope you all kind of took that in and</p> <p>16 were able to follow our superfund process. We have</p> <p>17 a nice little sign here that kind of shows our site</p> <p>18 and the superfund process works. So if y'all have</p> <p>19 any questions, this is the time now. You can ask</p> <p>20 you questions. And we'll kind of go around and take</p> <p>21 your questions. Also, we have our court reporter.</p> <p>22 So please state your name before you speak. Thanks.</p> <p>23 FORD: Hi. I'm Dawn Ford. My</p> <p>24 question is: What were the two neighborhoods that</p> <p>25 were established as clean, without lead</p>
<p style="text-align: right;">Page 27</p> <p>1 house. Do the best you can there. Wash the</p> <p>2 children's hands after they've been outside playing.</p> <p>3 Children tend to put their hands in their mouth a</p> <p>4 lot. So that's an important thing to protect them.</p> <p>5 Their toys. The pets. The pets can be outside in</p> <p>6 the yard and they can bring some of that soil in as</p> <p>7 well.</p> <p>8 And some of these other things. Like I</p> <p>9 said, keep the dust down. Damp mop your floors.</p> <p>10 And damp dust. It's important. You don't want to</p> <p>11 spread the dust around. But if you use a damp mop</p> <p>12 or a damp cloth when you're dusting, that can help</p> <p>13 keep the lead dust down.</p> <p>14 Something else you can do is make sure</p> <p>15 that your children eat well. Some of the things</p> <p>16 listed here: Iron-rich foods, calcium- and vitamin</p> <p>17 C-rich foods, they are all good to help protect your</p> <p>18 children from lead contamination, lead poisoning.</p> <p>19 And I have more information about that on the back</p> <p>20 table as well if you'd like some information about</p> <p>21 that.</p> <p>22 So one of the other things that our office</p> <p>23 is going to be doing is preparing a health</p> <p>24 consultation in conjunction with the EPA folks here</p> <p>25 and our partner with CDC, the agency for toxic</p>	<p style="text-align: right;">Page 29</p> <p>1 contamination?</p> <p>2 MR. JOSEPH: Two neighborhoods that</p> <p>3 were clean were College Hill Courts and Mountain</p> <p>4 View Courts.</p> <p>5 MR. TOLLIVER: Anyone else?</p> <p>6 UNIDENTIFIED MALE: In the last</p> <p>7 meeting, there were --</p> <p>8 MR. TOLLIVER: State your name.</p> <p>9 UNIDENTIFIED MALE: In the last</p> <p>10 meeting you mentioned --</p> <p>11 MR. TOLLIVER: Your name.</p> <p>12 MR. KENDALL: In the last meeting you</p> <p>13 had mentioned that there was a threshold of 1200</p> <p>14 for, I guess, the high concentrations. Are all of</p> <p>15 those completed?</p> <p>16 MR. JOSEPH: For now, yes. Because</p> <p>17 we sampled some additional properties back in May</p> <p>18 and June time frame. We identified about four of</p> <p>19 those properties where we found concentrations above</p> <p>20 the 1200. We addressed those over the summer.</p> <p>21 MS. RAULSTON: My name is Pay</p> <p>22 Raulston. And the properties that -- I have two</p> <p>23 questions. One is: The properties that do not have</p> <p>24 a color, have those not been enrolled or -- there's</p> <p>25 a lot of white spaces there.</p>

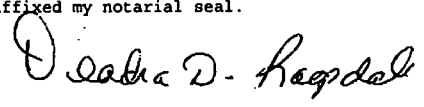
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<p>1 MR. JOSEPH: Well, basically these 2 are figures. This figure here is what we are 3 basically presenting is the results -- 4 MS. RAULSTON: Okay. 5 MR. JOSEPH: -- so far of the 6 properties that we have sampled. 7 MS. RAULSTON: Okay. 8 MR. JOSEPH: So anything that is 9 blank, that means that we haven't sampled it. 10 MS. RAULSTON: Okay. So how many 11 properties that you have not sampled are actually 12 enrolled? 13 MR. JOSEPH: Well, I don't have that 14 specific number -- 15 MS. RAULSTON: Okay. 16 MR. JOSEPH: -- as of yet. But what 17 I can tell you is, again, we estimated there were 18 some -- 19 MS. RAULSTON: Right, the 3600. 20 MR. JOSEPH: -- 3600 properties. And 21 to date, we have sampled roughly about 400. 22 MS. RAULSTON: Right. 23 MR. JOSEPH: So that means that there 24 about 3200 properties that we need -- 25 MS. RAULSTON: Right.</p>	<p>1 because -- 2 MS. RAULSTON: Okay. 3 MR. JOSEPH: -- that's the only way 4 forward. If we don't have access -- 5 MS. RAULSTON: Right. 6 MR. JOSEPH: -- we can't sample the 7 property. And if we can't sample it, we won't know 8 if it's contaminated or not. 9 MS. RAULSTON: Right. That's one of 10 the things I was wanting to know. The second thing 11 I'm wondering about is the less than 360 milligram 12 per kilogram. What's the average lead level in 13 those properties? How much below 360 are these 14 properties running? 15 MR. JOSEPH: Well, we have a wide 16 range, as you can imagine. In some instances we 17 have very low concentrations. 18 MS. RAULSTON: Okay. 19 MR. JOSEPH: You know, off the top of 20 my head, I couldn't tell you exactly what it was, 21 but some were low and some were -- 22 MS. RAULSTON: Okay. 23 MR. JOSEPH: -- (multiple people 24 talking) 360. But what we do, we go one step 25 further. When we have concentrations on our initial</p>
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<p>1 MR. JOSEPH: -- to sample. But 2 now -- 3 MS. RAULSTON: Have they signed up? 4 MR. JOSEPH: Well, what we have also 5 -- two months ago we started a very aggressive 6 program -- 7 MS. RAULSTON: Okay. 8 MR. JOSEPH: -- having people out in 9 the neighborhood -- 10 MS. RAULSTON: Oh, good. 11 MR. JOSEPH: -- trying to get those 12 access authorizations signed. And to date, I 13 believe we have roughly about 470 of those -- 14 MS. RAULSTON: Okay. 15 MR. JOSEPH: -- properties. 16 MS. RAULSTON: Great. 17 MR. JOSEPH: And we plan to mobilize 18 out in the field doing the week of December the 19 3rd -- 20 MS. RAULSTON: Okay. 21 MR. JOSEPH: -- so that we can sample 22 all of those properties for which we have access. 23 But, again, we come back to access again. 24 MS. RAULSTON: Yes. 25 MR. JOSEPH: Please help us out,</p>	<p>1 screening where we found that these concentrations 2 are borderline to that 360, we go one step forward 3 by screening those samples. And then we go one step 4 further to ensure that that concentration is really 5 low and below that 360. 6 MS. RAULSTON: Okay. The 8 7 micrograms per deciliter in blood. I'm surprised 8 you're not using the health professional level of 9 CDC, because they are child health specialists. 10 MR. JOSEPH: Well, like I said also, 11 we perform risk assessment and we have, you know, 12 our technical folks and scientists. And they 13 concluded that it was that range of -- 14 MS. RAULSTON: Okay. 15 MR. JOSEPH: -- five to ten, which is 16 somewhat acceptable level. But what we usually do 17 -- again, like I said, I am not a risk assessor. I 18 don't want to dive too deeply into that. But the 19 recommendation I had from my risk assessors is that, 20 well, 8 milligrams per deciliter is not ideal based 21 on CDC's criteria, but we use that range as our 22 acceptable when sampling. 23 MS. RAULSTON: Okay. 24 MR. TOLLIVER: And I also want to 25 just let y'all know if y'all are interested in kind</p>

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<p style="text-align: right;">Page 34</p> <p>1 of being organized, we have some tools. I'm Ron 2 Tolliver. I'm one of the community involvement 3 coordinators. And so what we can do, is we can kind 4 of help you kind of get organized so we can empower 5 you to kind of disseminate information to your 6 neighbors and to other community members as well. 7 So we have tools like that. So you can see me after 8 and I can kind of get you information for that. 9 Okay?</p> <p>10 Any other questions?</p> <p>11 MS. HOOPER: Rebecca Hooper. Our 12 property has been -- you know, the levels 13 (inaudible). The property next to us, we can't 14 figure out how to contact. There's an empty lot 15 next to us. All on our street, those people have 16 had higher than acceptable levels. But I don't know 17 if there's some resource you can give me to figure 18 out who owns that property so that -- but they 19 haven't, you know, signed off to have it testes yes. 20 So we'd kind of like to have that, you know.</p> <p>21 MR. TOLLIVER: Right. So that's --</p> <p>22 MR. JOSEPH: Well, we have our 23 contractor. The Hester Group is helping us out in 24 terms of looking at county records and stuff like 25 that so that we can identify the property owners and</p>	<p style="text-align: right;">Page 36</p> <p>1 Does everyone feel comfortable with the presentation 2 going forward? Okay. That being said, this is the 3 end of our presentation. Thank you all for coming 4 out. 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>
<p style="text-align: right;">Page 35</p> <p>1 reaching out to them so that we can get the access 2 authorization.</p> <p>3 MS. HOOPER: Okay. So you're still 4 trying.</p> <p>5 MR. TOLLIVER: Yes.</p> <p>6 MS. HOOPER: (Multiple people 7 talking.) -- approval for (multiple people 8 talking --)</p> <p>9 MR. TOLLIVER: Oh, yes.</p> <p>10 MS. HOOPER: Okay.</p> <p>11 MR. JOSEPH: It's an ongoing process.</p> <p>12 MR. TOLLIVER: Right. So that's what 13 I mean by kind of get organized where we can kind of 14 share word of mouth.</p> <p>15 MS. HOOPER: I don't know what other 16 resource to use.</p> <p>17 MR. TOLLIVER: Right. Well, if you 18 hear something --</p> <p>19 MS. HOOPER: Yeah.</p> <p>20 MR. TOLLIVER: -- you can let us 21 know. My contact information is over there. Let us 22 know. Stay in touch. And we'll kind of let you 23 know how that process kind of works.</p> <p>24 MS. HOOPER: Okay.</p> <p>25 MR. TOLLIVER: Okay. Anyone else?</p>	<p style="text-align: right;">Page 38</p> <p>1 REPORTER'S CERTIFICATION 2 STATE OF TENNESSEE ) 3 COUNTY OF HAMILTON ) 4 5 I, DEADRA D. RAGSDALE, LCR #278, licensed 6 court reporter and notary public, in and for the 7 State of Tennessee, do hereby certify that the above 8 meeting was reported by me and that the foregoing 9 pages of the transcript is a true and accurate 10 record to the best of my knowledge, skills, and 11 ability. 12 13 I further certify that I am not related to 14 nor an employee of counsel or any of the parties to 15 the action, nor am I in any way financially 16 interested in the outcome of this case. 17 I further certify that in order for this 18 document to be considered a true and correct copy, 19 it must bear my original signature, and that any 20 unauthorized reproduction in whole or in part and/or 21 transfer of this document is not authorized, will 22 not be considered authentic, and will be in 23 violation of Tennessee Code Annotated 39-14-104, 24 Theft of Services. 25 26 I further certify that I am duly licensed 27 by the Tennessee Board of Court Reporting as a 28 Licensed Court Reporter as evidenced by the LCR 29 number and expiration date following my name below. 30 In witness whereof, I have hereunto set my 31 hand and affixed my notarial seal. 32 33  34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100</p> <p>DEADRA D. RAGSDALE, LCR #278 Expiration Date 6/30/2020 Notary Public Commission Expires: 8/25/2020</p>

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